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LANDS AND PEOPLES SERIES

# SOUTH AMERICA

## A GEOGRAPHY READER

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*With an Introduction to the Series by* RICHARD ELWOOD  
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## THE PREFACE

South America, even more than Africa, has for years been the *Dark Continent* to the average teacher. Its geographic literature is meager, and much of it is in Spanish, Portuguese, and German. Where can the teacher go for a lively description of the long desert of Atacama? Until the English edition of *Brazil* by Pierre Denis was published (1911), where could be found a real explanation of the geographic provinces of that country? To-day the best work on the Argentine is in French; and the best brief description of the high plateaus of Bolivia and Peru is in German. It is impossible for the busy teacher in the public schools to gather from the best books, even if lists of them were available, the material for good work on the geography of South America.

The aim of this little book is to put into convenient form for elementary students some of the material I have gathered during the past ten years of study and travel. It is not a handbook. It does not pretend to cover all parts of the continent in the same detail. I have chosen those subjects that appear to me to be most interesting or most important in the present state of knowledge of South America. No one who writes a book worth reading applies a foot rule to his subject. I conceive that an excellent geography of any continent might be written for children which dealt only with houses or dress or villages or roads. No one carries, or indeed could carry, into his maturer years a well-proportioned knowledge of grammar-school subjects. That some knowledge should stick and that it should be sound and important—these are the chief considerations. So the question of presentation is,

first, the determination of what is sound and valuable, and—what is of at least equal importance—how it can be presented so as to be interesting.

Endless experiment is needed. The best results are not easy to achieve. Thus new books are appearing which are worth while if they present new facts or illustrate better methods. Whether the method followed in the pages of this book is better than those now in vogue, only experience will tell. Many of the facts I have gathered first-hand in the course of various scientific expeditions to Peru, Bolivia, Chile, and the Argentine, and these will have at least some interest for the teacher, if not for the pupil.

Most of the illustrations are from my own collections. Others have been gathered from various sources acknowledged in the text. I wish here to express my hearty thanks for the help received in this form. I am particularly indebted to Neville B. Craig for the excellent photographs of the Madeira River region in the chapter on the Amazon.

ISAIAH BOWMAN

*Yale University*  
*December 10, 1914*



## THE INTRODUCTION

Many attempts have been made in the past to prepare supplementary geography readers that would enable teachers to increase the emphasis that can be given to the picturesque side of geography—that is, to add good, strong side lights to the necessarily brief and sometimes formal presentation of the more comprehensive textbooks. Such reading-matter obviously ought to be as accurate, authoritative, and systematic as the material of a textbook, and must be presented in an appealing and readable form. Children of the age to get profit from such supplementary work are attracted by a volume that tells a story in an absorbing and enlightening way, just as they are by a story full of action. In either case, the book that causes the child to curl up in a corner and lose himself in his reading is the valuable book, provided its contents are sound, inspiring, and educative in the best sense. Children want to have faith in the realness and the value of what they read and to be able to relate the newly acquired material to the more familiar matter gained in formal study.

The editor and publishers have attempted to meet these demands in the series of supplementary volumes, of which this is the second to appear. Each author who is contributing to this series is a geographer of high repute, an authority on the country described, whose accounts are accepted as standard by the scientific world. Each one writes from a fullness of knowledge of the facts depicted and with a keen appreciation of the way the people in each country reflect the influence of the

geographic surroundings in their habits and customs. The editor has secured the services of the several authors, has planned the larger features of treatment, and has edited the manuscripts from a common viewpoint so as to secure a certain uniformity of plan of presentation, but he has in no way sacrificed the individuality of the authors' work.

Thus the series will be a collection of expert treatises, written for a special purpose and from a common viewpoint. It will not be a compilation of the work of others or a series of travelers' notes especially prepared to amuse. It will be a standard treatment of the world by regions, from the modern standpoint that geography is a study of the earth in its relation to man and life and that the most interesting topics in geography deal with the lives of peoples and the reasons for their habits, customs, industries, and distribution.

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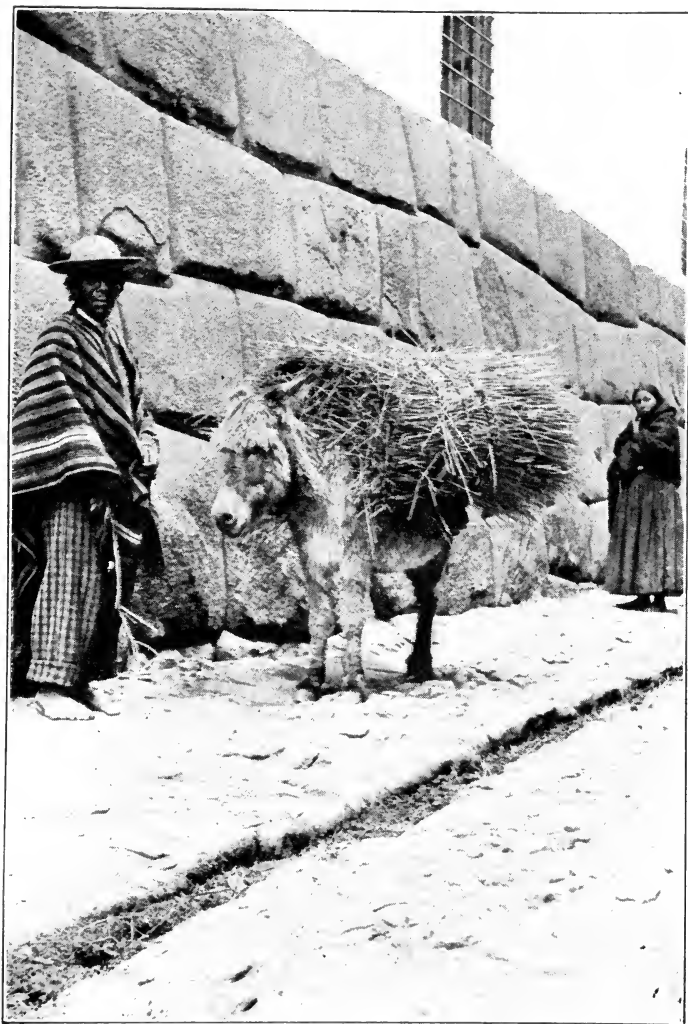
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*Quichua Indians and donkey loaded with wheat straw, Cuzco, Peru.  
Also portion of the famous palace formerly used  
by the Inca rulers*

# SOUTH AMERICA: A GEOGRAPHY READER

## CHAPTER I

### PEOPLE AND THE LAND THEY CONQUERED

**The "Conquistadores" or Conquerors.** In one of the stories of *The Arabian Nights* Sindbad of the Sea landed at the "City of Apes," so called because the tall coconut trees along the shore and the caves in the mountains were inhabited by great numbers of these terrifying beasts. The houses of the city were built overlooking the water with doors that opened to the sea, and every evening for fear of the apes the people embarked in boats to return at daylight. If a man stayed behind for the night the apes came down from the trees and the mountains, entered his house, and killed him. During the day the apes threw coconuts at the people, and these were carefully gathered both for food and to exchange for merchandise brought in ships from other lands.

Like all the other stories in *The Arabian Nights*, the story of the City of Apes was told merely to entertain people, though at the same time it taught them that there were such things in the world as apes, and coconuts, and trade.

More than a hundred and fifty years ago a number of books on geography were written full of equally wonderful tales of strange lands and people, all supposed to be true. Indeed, these tales were read even by grown people with very much the same interest that children now read fairy stories. Each chapter ended with an account

of the "rarities" or "curiosities" of some country, in which were told the wildest tales that travelers could invent. The people of Russia were said to wear clothes made from the woolly skin of a melon; the Amazon Basin was inhabited by a race of women of great size whose heads were placed not above their shoulders but between them; and in other parts of South America there lived beasts having the body of a man, the head of a lion, and the face of an ape. One of the most incredible "wonders" in these books was that of El Dorado, a tale that was believed for several hundred years after the discovery of America, and on account of which men actually left their homes by thousands to fight under foreign skies.

There are many contradictory accounts of the beginning of the story of El Dorado. Perhaps the most reliable among these is one which relates that the story was first brought to the Spanish conquerors by an Indian in Ecuador. Knowing that love for gold was the ruling passion of the Spaniards, he told them that in the remote interior there was said to be a "Man of Gold." About the Indian who brought the tale the Spanish soldiers came crowding and questioning. "Was the place at a great distance?" "How could one get there?" "Would he show them the way?" No one thought to ask, "*Is the tale true?*" because those were the days of marvelous discoveries and bold adventures. Not only were men having amazing experiences—they were always expecting greater marvels than any that had come to pass and were eager to believe the wildest fancies. So when they heard of El Dorado their imaginations played with the story until they *thought* the Indian had told them that El Dorado was a great city filled with gold palaces, and that it was inhabited by men and women dressed in gold cloth, and, with gold spoons, eating food cooked in golden kettles.



Though the story was not true it was long believed, like similar stories about the fountain of youth and King Solomon's mines, and the belief drew thousands of adventurers into the wilderness in search of sudden wealth. The explorers and the conquerors of that period traveled up and down many rivers, crossed lofty mountains, and upon their return published maps and notes which for a long time furnished people with the only information they could get about the great interior of South America. Perhaps without the story of El Dorado and the search for it the first explorations of the vast interior of the Amazon Basin might have been delayed for a hundred years. In the footsteps of the explorers, and sometimes even in their company, went missionaries of the church, baptizing the natives, christening the children, and erecting missions where they might teach the Indians "for the glory of the cross."

**The True El Dorado.** With the "conquistadores" and the missionaries, and in greater numbers after them, came farmers and herdsmen, whose object was not to search for gold or silver but to make homes in a new country. Some of them, sailing south from Panama, settled in the rich valleys of Peru, others settled in central Chile and on the shores of the La Plata estuary, and there were some for whom the unknown Andes offered no terrors and who founded trading posts and homes in the remotest mountain valleys and even in the forests of the great Amazon lowland. While the greater number of the newcomers were men, there were also a few women and children who faced dangers and hardships that appalled the strongest. These people were the real conquerors of South America. On the pampas of the Argentine, the plains and valleys of Venezuela, and in the mountain basins and valleys of Peru and Chile

they discovered an El Dorado far richer than any of which the early explorers had dreamed, for the soil is

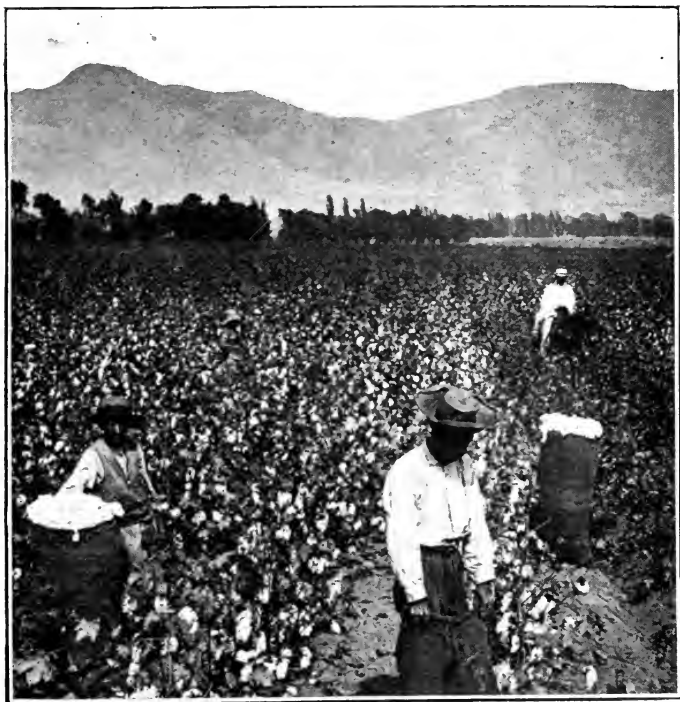


FIG. 1. *Fertile irrigated garden farms near Lima, Peru.  
Almost every foot of ground is used. The water is  
obtained from the Rimac River*

the enduring wealth of the land (Figs. 1 and 2). Little did they think that their descendants would live to see new nations arise, great herds feeding upon once empty grasslands, and the crowded peoples of western Europe dependent for at least a part of their food supply upon the grain fields and pastures that their explorations had made known.

**The Wars of Emancipation.** For several hundred years the settlers remained loyal to the monarchs of Spain, paying taxes and on the whole obeying the laws, whether these were good or bad. When so-called Spanish rule came to be recognized as misrule, and the laws and taxes of Spain became too irksome, the settlers began what are known as the "Wars of Emancipation." Each

group of settlers had its own particular grievance against Spain, and each was separated from its neighbors by miles of wild, unsettled country. The settlements about Carácas and the seaport La Guaira joined with those at Valencia, and, after a long, heroic campaign, defeated the armies of Spain and founded the republic of Venezuela. About the same time there was fighting in Peru and in Chile; and on the shores of the Rio de la Plata the settlers were planning the overthrow of Spain and the



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FIG. 2. *Picking cotton with Chinese labor on irrigated land in a fertile valley at the foot of the Andes, Uitarite, Peru*

establishment of a confederation that has since grown to be the Argentine Republic. Gradually each group became independent, and republics were formed with governments modeled after that of the United States.

**The Character of the People.** Although the white people of South America are for the most part descendants of Spaniards and Portuguese they are by no means alike in character. Some are children of the wide pampas or grasslands of the Argentine; others live a secluded life in the mountain fastnesses of the Andes; in the rubber forests of the wet Amazon lowlands are isolated settlements rarely visited by white men even to-day; while in the smiling valleys of central Chile, where the climate is temperate, there live the energetic Chileans.

The differences between these various groups of people in many ways remind us strikingly of similar differences among plants and animals and suggest that people, like plants and animals, are to some extent what their surroundings make them. On the wet Orinoco lowlands, when the river floods the country for miles the people have to live in the second stories of their houses, or in the trees like some species of frogs. The bronzed and weather-beaten faces of the desert people remind us of the cactus with its thorns and hard exterior; the tempests of the pampas and the fleet *guanaco* are scarcely more wild than the *gauchos*, a class of men in some respects like the picturesque cowboys of our western plains.

Just as we can tell a Scotchman from an Irishman or a Persian from an Armenian, so we can tell a Peruvian from a Chilean or a Colombian from a Brazilian. Not only are there differences of speech from place to place but also slightly different customs which appear to have grown out of the kind of place in which the people have settled as well as the province in Spain or Portugal

from which they came. With the growth of separate republics each with its national spirit these differences have become greater. The native of Valparaiso no longer says with the man from Quito or Lima, "I am a Spaniard," but "I am a Chilean." Men who herd cattle are likely to be different from men who hoe gardens or gather rubber on great rivers. In some countries real statesmen have been developed, in others the government has been run by coarse politicians who have robbed the people; one country has enjoyed a stable government because the people are proud of their flag and teach their children loyalty to rulers; another country has on the average a new revolution every eighteen months!

To one who has enjoyed the hospitality of a shepherd's hut in the mountains, or lived for weeks in the saddle riding through the grassy plains of the Argentine, or walked for days in and out of the houses of the coffee pickers in the state of São Paulo, Brazil, even the smaller differences among the people of South America appear as interesting as the larger differences that give each nation distinction.

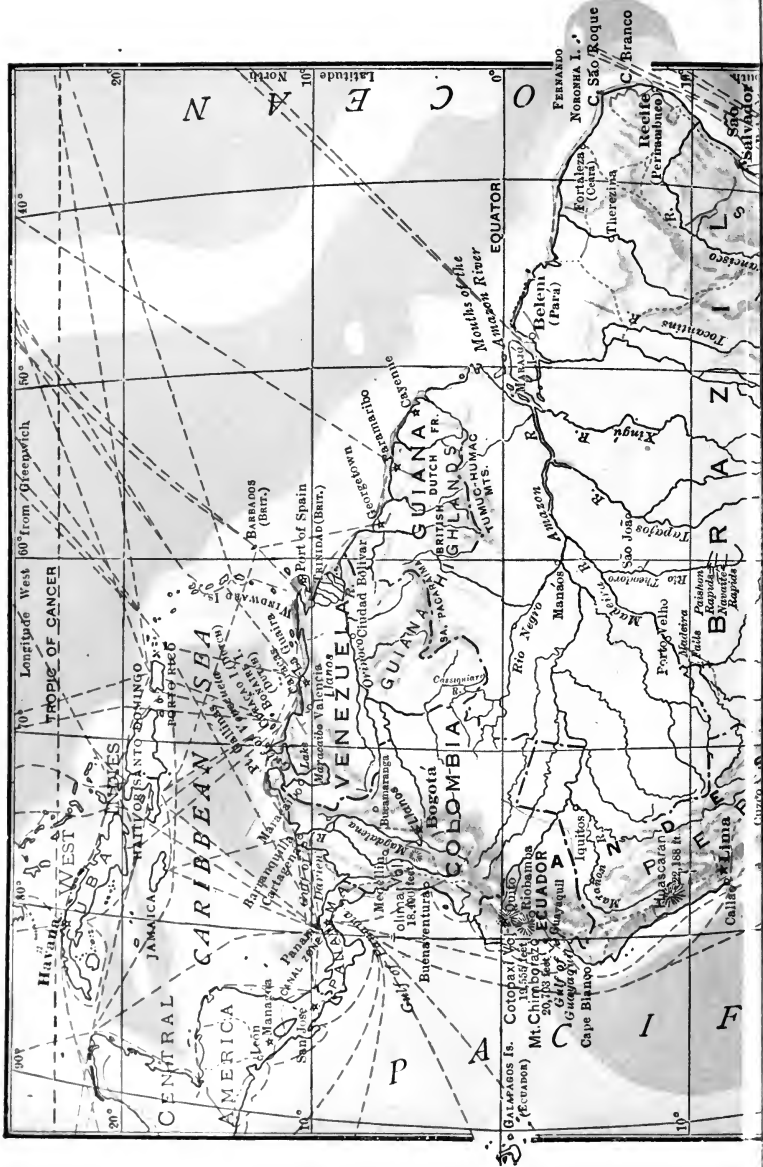
The Anglo-Saxon race to which we belong is known in the world for its force of character, its habit of speaking directly to the point, and, to some, for its lack of polite manners. The Latin peoples—among them the Italians and the Spaniards—think Anglo-Saxons are rather rude and are inclined to boast that even if Latin peoples are not so successful in making vast sums of money they are at least polite in making a little money.

A man from Boston once visited a schoolroom in Spain and heard the teacher tell the children that Americans are very cruel. "Just think," she said, "American boys have been known to fight with their fists, like animals, until their noses became bloody." Upon his return the

traveler happened to step into a schoolroom in Boston and there heard a teacher say: "The Spaniards are a cruel and bloodthirsty people. Every Sunday they gather around a great arena and watch bullfights at which bulls are cruelly killed, horses gored, and men trampled by infuriated beasts." The Spaniards are no more cruel than we, some of them are much more courteous, and many of them are also very energetic and successful. Perhaps it would be well if each race gained the best qualities of the other. It certainly would do no one *harm* to be as polite as a Spaniard.

The stranger is everywhere made to feel at home by the charming phrase, "Please consider my house your own," whether the host lives in a hut or a palace. From those who live in the larger cities the phrase carries good will rather than a real invitation to move your baggage into the best room. From the owner of a rich *hacienda* (plantation) or from the humble shepherd it carries a literal meaning. A traveler once stopped at a Bolivian hut on the edge of the Amazon Basin. He had come from the cool highlands in a single day and was too tired to do more than eat some soup and fried yuca and to accept the owner's invitation to sleep in the dining room, an invitation which ended with the usual phrase—"because it is your house, you know." But the close air of the stuffy little room, the pest of flies and mosquitoes, and the cackling of the startled hens roosting over the table on which the traveler had spread his bed, made sleep impossible; so the next day he pitched his tent near the bank of a river some distance from the hut. At this the owner was very angry. It appeared to him as if his invitation had been scorned, and only after long explanation could he be made to see that the soft sand bar, covered with driftwood and well











supplied with fresh water, was an ideal camp site for people accustomed to sleep in the open. To offer to pay a *hacendado* for a night's lodging is to break a friendship which on his part began when he invited you to rest yourself and your beasts under his roof.

**Harbors and Products.** The countries of South America for the most part enjoy easy access to the long coast and to the world's trade routes. A position in the remote interior would mean a degree of isolation that would prevent growth because products would have to be shipped down long winding rivers or across lofty mountains. Only Paraguay and Bolivia are without a seacoast, though Paraguay has a river channel which brings steamers to the gates of the country. Bolivia, on the other hand, depends upon railways across Chile and Peru, having lost all of her maritime territory to Chile during the war of 1879-1883.

Like so many other conditions in South America, this is not well known to many of the people of other continents. Some years ago a European nation had trouble with Bolivia and one of the European statesmen is said to have remarked that if Bolivia did not come to terms it would be necessary to send a battleship over to South America and bombard La Paz, the capital of Bolivia. In order to bombard the city the guns of that battleship would have had to shoot about four hundred miles! Of course the statesman felt very much ashamed when he was told that La Paz was so far from the sea, and we may be sure that before he talked any more about Bolivia he opened an atlas and studied the geography of South America.

Since nearly all the countries of South America border the sea, a trip around the continent gives the traveler some idea of the various people and their products.

Along the coast are the important harbors which serve as gateways to the great interior spaces. At Pará is the rubber hunter; the man who gathers turtles' eggs for a living; the German merchant who trades manufactured goods for crude rubber. At Bahia the warehouses contain cacao, tobacco, and sugar. At Santos the air is loaded with the odor of coffee, and ships from all the coffee-drinking countries of the world crowd the docks. The grain boats that come down the Paraná from Rosario, as well as the steamers at the docks of Buenos Aires, tell

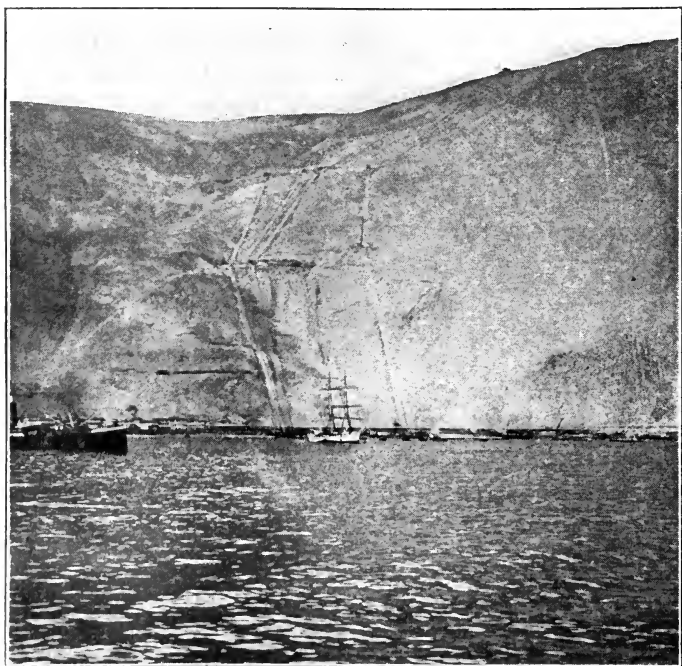


FIG. 3. *A railway line up the face of the steep three-thousand-foot bluff at Caleta Buena, northern Chile. Nitrate of soda is the chief export*

us of the extensive farms and ranches and the wide spaces of the pampas of the Argentine, while the boats from the southern coast carry great cargoes of wool brought to Gallegos and Porto Madryn by the lonely sheep herders of the bleak gravel plains of Patagonia.

Nowhere else in South America is there a coast so peculiar as that in northern Chile, where the steep cliffs rising several thousand feet



FIG. 4. *The rough surface of a salt plain in the desert of northern Chile*

above the sea are bare from top to bottom and seem to lead up to a desert quite unfit for man (Fig. 3). But beyond those great cliffs is a pampa, or plain, which contains nitrate, a substance so valuable and so rare that ships from almost every country in the world lie in near-by ports to receive cargoes of it. This nitrate is to be used in fertilizers, gunpowder, and other chemicals in both Europe and North America (Fig. 4). The cotton and sugar of Peru (Figs. 1 and 2) are carried to northern countries in large quantities, and in Ecuador there are produced every year thousands of pounds of cacao, from which some of our chocolate and cocoa is made (Fig. 5).

When a man buys a rubber coat he is buying in part the

labor of a savage who gathered sap from a rubber tree, smoked it over a fire of palm nuts, and carried it down-



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FIG. 5. *Gathering cacao pods from which the chocolate and cocoa of commerce are produced, La Clementine plantation, Ecuador*

stream in a dugout canoe; when we drink coffee we are drinking a product of the red soil and brilliant sunshine of São Paulo, Brazil; the shoes on our feet may have been made from the hide of an Argentine steer; the big guns of our battleships, as well as the firecrackers used in our celebrations, may be charged with powder containing nitrate from Chile; and the chocolate for the frosting

on our cake once grew as the seed of the cacao tree in cucumber-shaped pods and was gathered and dried by some swarthy, barefooted native in "the land of the Equator."

## CHAPTER II

### THE SOUTHERNMOST PEOPLE IN THE WORLD

**The Home of the Yaghan Indians.** At the extreme end of the group of islands that fringe the southern end of South America live the Yaghan Indians, the remnants of a folk in many respects unique among the savage people of the earth. Some idea of the kind of place which they inhabit may be gained from the map (Plate IV), which shows that the Yaghans live in latitude fifty-five degrees to fifty-six degrees south, or about as far south of the equator as Sitka, Alaska, is north.

Like the Eskimo, the Yaghan is a child of nature. His life is a constant fight for food, of which there is little enough in a land so wet and cold. Like the "roaring forties," this is a region where the west winds sweep over land and sea. Steep mountains rise abruptly from the water's edge, and about their peaks storm clouds hover almost constantly. At least three hundred days of the year are cloudy. A dull sky, rain-swept mountain sides, the wind a gale, the sea beating the shores of the outer islands furiously, snow- and ice-crowned mountain tops,—these are almost constant elements of the scenery in this land of the southernmost people in the world.

The great naturalist, Darwin, as a young man made a very important study of the region and wrote the first clear description of the people. The following quotation is from his well-known book, *The Voyage of the Beagle*.

"The lofty mountains boldly rise to a height of between three and four thousand feet. They are covered by a wide mantle of perpetual snow, and numerous cascades pour their waters through the woods, into the narrow



channel below. In many parts, magnificent glaciers extend from the mountain side to the water's edge. It is scarcely possible to imagine anything more beautiful than the beryl-like blue of these glaciers, and especially as contrasted with the dead white of the upper expanse of snow. The fragments which had fallen from the glacier into the water were floating away, and the channel (Beagle Channel) with its icebergs presented, for the space of a mile, a miniature likeness of the Polar Sea."

The Yaghans are among the most primitive people on the earth to-day. The leisure and wealth that many of the people of the temperate zones possess is here unknown. The food supply in any particular place is small, hence the number of people found in any one place is small. From twenty to thirty men and women may live together as a clan, sharing in common the food supply and the danger of securing it. The entire energy of every man, woman, and child is spent in getting food, and this is usually of the poorest kind. If the members of a group are not actually engaged in gathering clams, seals, and fish—their principal diet—they are searching every cove for a favorable place in which food may be found. Often a single family of three or four—mother, father, and children—live apart from the rest in an isolation that appears to us both strange and fearful. The necessity for assistance in case of accident, of protection against an enemy, and the getting of food, is so great that life is more tolerable when a few families live together as a group and have a certain amount of assistance from each other in time of need.

**Sea Food and Canoe Fires.** Instead of our comfortable houses they have only the roughest shelter of bark and twigs such as an animal might find at nightfall; instead of having a fixed home they move frequently and abandon

one place as soon as a better food supply can be found in another; although they live in a very bleak and cheerless land their clothing is only a piece of sealskin which but partly covers the body and is shifted from one side to the other to correspond with the direction of the wind!

A regular food supply from meal to meal and from week to week is to them unknown. If a dead whale is washed ashore there is a feast; such also is the case if an exceptionally good bank of shells is found upon some little-visited beach. But it often happens that a storm arises and lasts for days, confining the canoes to the land. Then if there is no food accumulated, and if the storm is severe enough, the group may be reduced to actual starvation.

Travel by land is so difficult that it is rarely undertaken. Furthermore, these people are children of the sea rather than of the land. They are as much at home in a canoe as they are when walking on the shore. So little attached does it become to any particular home place, that when an Indian family goes out on a voyage it carries along its fire, kept burning upon some earth in the bottom of the canoe, thus assuring means for warmth and cooking when the next landing is made.

**The Onas of Tierra del Fuego.** Upon Tierra del Fuego are the Onas, a primitive group of people who still lead a savage life such as their fathers led. Once their homes were scattered over the whole island, but since the coming of the European settlers, more than thirty years ago, they have been driven from the plains and are found only in the mountains of the south. The lowlands are now almost completely occupied by the sheep ranches of the white people.

Before the whites came, the Onas depended chiefly upon the *guanaco* for food and clothing. Like its cousin

the llama (Fig. 74), the guanaco appears to be half sheep, half camel, is very swift, and yields a warm, soft skin much used for clothing. But with increase in settlers the guanaco became very scarce. The Onas called the sheep of the settlers "white guanaco," and found them easier to catch and their flesh tenderer and sweeter than that of the wild animals which had formerly been their main source of food. The guanaco became so scarce that the Onas, probably without thought of wrong, began to kill and eat the sheep that grazed on the land from which they had been driven. So many sheep were thus taken that the whites finally began a cruel war against the Onas, in some cases hiring men to kill them at sight. Some of them were captured and shipped to Dawson Island (latitude  $54^{\circ}$  S.), where tuberculosis has swept off most of those that were spared from the bullet. Even the blubber of the whale stranded upon the shores is said to have been poisoned so that those Indians who depended upon it for food would be killed.

**The Mountain Refuge of the Onas.** Were Tierra del Fuego composed wholly of plain doubtless the Onas would have been entirely destroyed by this time. But the southern part is mountainous and stormy and covered in part with dense forests. It is not the kind of country desired by the sheep farmer or ranchman, and here the Onas have made their last stand.

The lower mountain slopes of southern Tierra del Fuego are covered with evergreen beech trees and various shrubs. About two thousand feet above the sea the forests thin out and so bush-like do the trees become that one can step over them. In many places on the lower lands the growth is so rank that one cannot make headway except by cutting a path with an ax. From the twisted trunks hang long festoons of mosses and

lichens and the sweet fungus which resembles mucilage and is eaten by the Indians. Soft mosses, carpeting



FIG. 6. *Part of the town of Punta Arenas, Strait of Magellan*

the ground, hold the water at the surface and turn part of it into impassable bog.

"Among the mosses, and along the wood edges, delicate ferns, yellow violets, orchids, cranberries, compositæ, and other plants are found. But perhaps one of the most beautiful shrubs in the world is a flaming red honeysuckle-like plant. . . . As one cruises about the channels its flowers paint on the hillsides broad patches of beautiful red against its darker background of sombre green. The flowers here have practically no odor, but on bright sunny days, which sometimes do occur in this weird, sombre land, make the wood edges and grass lands quite gay in midsummer (December 21st)." (*Furlong.*)

**The Southernmost City in the World.** On the northern shore of the Strait of Magellan is Punta Arenas, a city of fifteen thousand people, which has the distinction of being the southernmost town in the world (Fig. 6). Unlike Africa and Australia, South America extends well

toward the Antarctic Circle. Cape Town in South Africa is only as far south of the equator as New Orleans is north; but Punta Arenas is as far south of the equator as Sitka, Alaska, is north of it. A map of the ocean trade routes of South America shows how important is the position of this unique town (Plate II). It is on the only water route through the southern Andes. Boats from Europe, Africa, or the east coast of North America desiring to make the west coast of South America have a choice of two routes: either the exposed and stormy route around Cape Horn, where one vessel in ten is lost or disabled, or the quieter and shorter route through the Strait of Magellan past Punta Arenas.

The strait is so narrow, however (in one place it is only a mile between the lofty shores), that sailing vessels find it very difficult to pass except with the most favorable wind and sea. Punta Arenas is therefore a great repair and coaling station for steamships on the southern routes, as Stanley on the Falkland Islands (Plate IV), several hundred miles east of the strait, is the great repair and supply station for sailing vessels. Fleets of steamers anchor in the port of Punta Arenas. Some of them receive coal for the long voyages between Europe and the west coast of South America. In addition, some of them receive the products of the country—the sheep, hides, tallow, and wool of the region north of the port.

Punta Arenas itself is a revelation to one expecting to see frontier conditions. It has electric lights, a few well-paved streets, a newspaper, and good telephone and cable service. The name of the town is the Spanish for sandy point (*Punta*=point; *Arena*=sand).

The prosperity of Punta Arenas depends largely upon the pastures north of the strait. East of the Andes

Mountains and extending northward for five hundred miles is a narrow belt of rich grazing country, whose southern end is now occupied by thousands of cattle, horses, and sheep. The products of the flocks and herds that graze on the plains bordering the strait are carried in huge wagons to Punta Arenas, whence they are shipped to the mills and factories of Europe and America, whither the steamers of the port are bound.

The life of the herders in the sheep and cattle pastures of this region is that of the ranch and camp. It is the kind of life so well known in the United States from the early ranching people of Wyoming and western Texas—a careless, free, out-of-door life with much privation from winter storms, snows, and cold, with plain fare, rough speech, a cheerful hospitality, and a certain frankness not always found in the manners of people who dwell in cities.

Many of the shepherds not only care for their flocks but also cultivate a few vegetables, and live in permanent homes. These men are for the most part English and Scotch. They have found here a country as well suited to grazing as their own, and where it is easier to make a living than in the crowded homeland.

### CHAPTER III

## PATAGONIA, THE "NO MAN'S LAND" OF THE OLD GEOGRAPHIES

**"No Man's Land."** Patagonia has long been known as one of the remote regions of the world, and until a few score years ago it was practically an unknown land. On the maps of the older geographies it was named "No Man's Land," for it was the property of neither Chile nor the Argentine and at that time neither cared much for it. It was a land of barren plains and heavy storms, without any white settlers. Of late years the region has become better known through explorations made by scientific men and the gradual occupation of the coast by Europeans who have come to the Argentine to engage in the grazing industry. There are still great areas in which one may travel for weeks without meeting a human being, not even an Indian, though even in the remote places men have made explorations and have given us very good descriptions of the extent of the land, the nature of its resources, and the character of its scenery.

**The Meaning of the Word "Patagonia."** When the Spaniards first visited the mainland of Patagonia they saw on the beach sands the huge footprints of Indians. The discovery was made at a time when men were not only finding new wonders every day, but were ready to invent and believe the strangest tales; and, since they had never before seen human footprints so large as these, they at once thought that they were in a land of giants. So they called the land "Patagonia," which means "big feet" (*patacon* = big feet). The people whose footprints had excited the wonder of the Spaniards were the Tehuelches, a tribe of kindly Indians who live on the wide, cold

plains of southern Patagonia. While they are not really giants, as the early explorers described them, they are, nevertheless, unusually large (Fig. 7). The average height of the men is about five feet eleven inches, and their average weight about one hundred and seventy-five pounds. The average height of the women is five feet seven inches; their weight is about the same as that of the men. By comparison it may be interesting to note that the average height of the white man is five feet eight inches, and of the white woman, five feet four inches.

**The Tehuelche Indians.** Although the Tehuelches are an uncivilized tribe they are very friendly to the stranger who travels among them. Their faces are frank, their tents of skin and their food are at the traveler's disposal, and their kindly manner and gentle disposition at once put the stranger at his ease. Many of the whites who have visited them have not, however, treated them fairly. White men's diseases have gained a foothold among these children of nature, and from a large tribe of perhaps five thousand they have been reduced to about five hundred. Their strong muscular bodies are able to withstand the cold wind and the snow of their bleak land, but the new diseases, especially tuberculosis, produce terrible effects among them. It will be only a matter of a few years until the Tehuelche Indians, one of the best tribes in America, will cease to exist.

**Hunting the Rhea and the Guanaco.** The Tehuelche Indians are a hunting tribe and depend for their food supply almost entirely on two animals of the Patagonian plains, the *rhea*, or South American ostrich, and the guanaco. These they hunt, not with firearms, as white men do, but with *bolas*, made of two or three small round stones, or large heavy balls covered with skin





FIG. 7. *Tehuelche woman*

and fastened together by strings of braided or twisted rawhide. Holding one of the stones in his right hand, the Tehuelche hunter rides after the game at a gallop until he is within striking distance. The bola is thrown in such a way that the whirling balls carry the strings round and round the legs, neck, or body of the animal, entangling and tripping it, whereupon the hunter dismounts and kills it. The rhea has such small wings that it is unable to fly and must therefore depend upon its legs for escape. Even flying birds may be caught if the hunter is able to steal upon a flock close enough to throw the bola among them as they rise, and entangle their legs or wings.

The Tehuelche hunter did not always depend upon the bola. Before the coming of the Spaniard he hunted chiefly with bow and arrow and was obliged to steal close to the game to bring it down. As soon as the horse was introduced the bow and arrow practically disappeared. The horse also helped the Tehuelches in war against the Pampa Indians, who lived on the plains north of the Rio Negro. When they depended upon their legs for safety their camps had to be made in the bottoms of deep cañons or hidden away among the rocks on the side of a valley, where their fierce northern neighbors could not find them. As soon as they learned the use of the horse they were able to camp almost where they chose, for if an enemy came they could take to flight and have a fair chance of escape. To-day one may find the old camping grounds of the Tehuelches in many places along the stream valleys. The ground is covered with broken pottery, and pieces of the bones of the guanaco, rhea, fishes, and birds, besides arrowheads in great numbers.

**The Harvest Time of the Tehuelches.** The busiest time of year for the Tehuelche Indians is the *guanaco*

*chico* or "little guanaco" season. Then he gathers for clothing not the skin of the ordinary guanaco, killed for

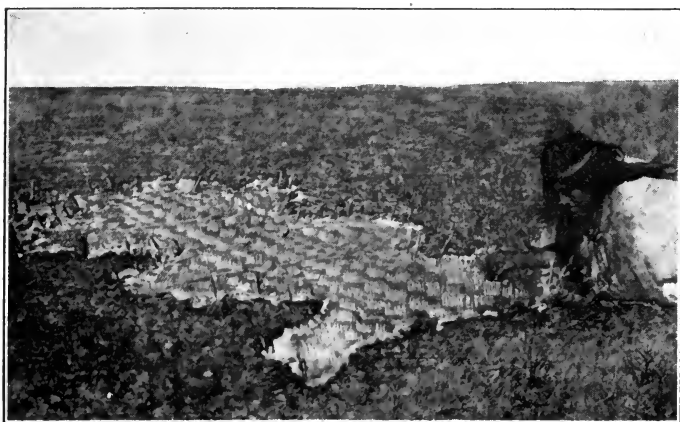


FIG. 8. *Tehuelche squaw painting a guanaco skin*

its meat, but the skin of the very young. The little guanaco season extends from November 15 to February 1. After a camp site has been selected in some region where the guanaco come in great numbers to feed and drink, the men begin to hunt the young and none is killed that is older than two months. The very best bedding and clothing is made from the skins of guanaco that have just been born. The men do the killing and skinning while the women dry and cure the skins and make them into garments. The different skins are sewed together so nicely that it is difficult to tell where one begins and the other ends. Sometimes very pretty effects are made by combining certain natural colors in the skins of the animals. Frequently the completed garment is decorated with paint to give it a more striking appearance (Fig. 8).

In September and October the Tehuelches gather the eggs of the rhea. These are laid in holes scooped out of

the ground, perhaps forty or fifty in a single spot—due to the peculiar habits of the females, several of which use the same nest.

**A Tehuelche Home.** The home of the American boy or girl is made of wood or brick or stone, or more rarely of sod

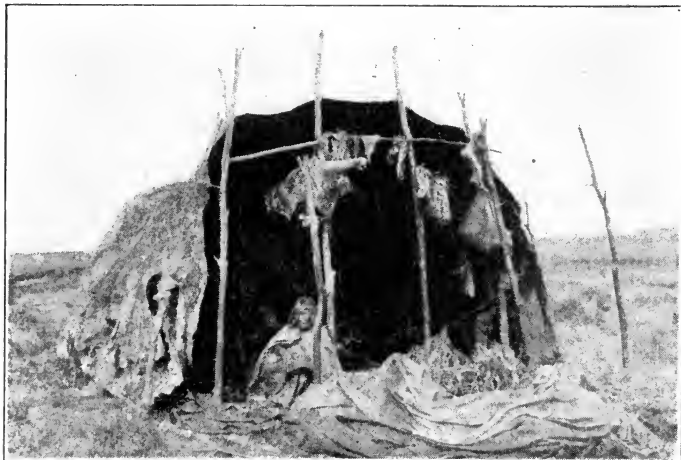


FIG. 9. A typical "toldo" or tent, home of a Tehuelche family

or adobe, but the home of the Tehuelche child is made of the skin of the guanaco. The Patagonian plains have almost no timber, and in place of it the Indians must use the skins of animals. The Tehuelche tent, or *toldo* as it is called in Patagonia, is made of a number of skins sewed together and fitted over a framework of poles (Fig. 9). Because of the prevailing westerly winds, the front of the tent is always placed so as to face the east. Stakes are then placed at the opening and to them is attached an apron about four feet in height so that when the wind blows from the east, as it does once in a while, it may not blow into the tents. Sleeping places are arranged in the rear, each place being made large

enough for two people. Adjacent bunks are separated from each other by a skin partition. Rugs are spread on the ground, and these are covered with bedding which consists of the soft skins of the very young guanaco.

The toldo serves the Tehuelche much better than a wooden house because, if he wishes to move to a new hunting ground or flee from an enemy, he can with little trouble pack up the skins, carry them to a new site, and quickly set them up again. In this rude home the Tehuelche has a certain amount of comfort and altogether he is fairly well off, for he is physically well made, has abundant game, and is relatively free from trouble with his neighbors.

**The Surface of Patagonia.** Patagonia extends from the Rio Negro (Plate IV) southward about one thousand miles to the Strait of Magellan; and from the Atlantic to the Pacific it is from two hundred to four hundred miles wide. The part that lies in Chile is made up chiefly of mountains whose lower slopes are covered with forests, and whose rocky and treeless upper slopes are partly covered with snow and ice. Among these mountains are a number of fertile valleys, and toward the north and east some of these are occupied by settlers, but by far the greater number of the people in the region live in Argentine Patagonia, where treeless, grassy plains and a less severe climate make grazing possible. Patagonia is so vast that one cannot describe the country as a whole in a general way but must divide it into natural regions, each of which has rather uniform surface and climate. Along the eastern coast there is a narrow strip of land about twenty to fifty miles in width marked by wave-cut terraces of great size. In the general uplift of the land there were intervals when the land remained at a given level long enough for the waves to plane

off a coastal platform. The process, repeated several times, at length gave rise to a series of platforms each with a flat top and a rather abrupt face. Uplift later on made terraces out of the platforms.

**The Herdsmen of the Coast.** In the best places along the coast one finds settlements such as Gallegos (Fig. 10), Port Desire, Port San Julian, and Santa Cruz. The people who live in these out-of-the-way places are Scotchmen, Englishmen, Welshmen, and a few Germans and Italians. They have come from their crowded home



FIG. 10. *Rio Gallegos, Patagonia, at low tide*

countries to a new continent where land is free, and although they are in a remote corner of the world and live in rough homes, they at least have plenty to eat and to wear. Nor is the new home entirely different from the old one, for the people who come to Patagonia are for the most part herdsmen. To the Scotsman especially the new home is quite like the old, with its frequent storms, its dull, leaden skies, its low temperature, and its extensive sheep pastures.

**The Shingle Plain of Patagonia.** West of the coastal strip of land where most of the herders live, one finds an upland region of little value to man. The rainfall, insufficient for the best growth of grass, sinks rapidly

into the earth and in places leaves the surface dry and barren. In the southern part of Patagonia is a region covered with coarse gravel and small stones that go by the name of *shingle*. This material was laid down by icebergs when the land stood lower than now and while local ice sheets covered the mountains to the west. As the icebergs drifted seaward over what is now the shingle plain, they were gradually melted and their load of sand and gravel was dropped to the sea floor,—the surface that was later to become the land of to-day. The process was not unlike that off Newfoundland and still farther south where icebergs from Greenland finally melt and drop their load of waste on the continental shelf which they have helped to make. A part of the material was washed into place by streams that descended from the mountains after the land rose above the sea.

Besides the shingle plain there is in the Argentine provinces of Santa Cruz and Chubut a great tract of barren plateau country. Molten rock from the earth's interior was here forced out through fissures in the earth's crust to form a thick surface layer of rock known as *basalt*. So recently was this plateau formed that the rock has not yet decayed to form soil; hence grasses and shrubs are almost wholly lacking. The rivers that flow through the basalt plateau have cut deep cañons that are very difficult to cross. The guanaco and the *vizcacha*, a kind of prairie dog, live along the cañon floors, where a little vegetation may be found. At irregular intervals Indian bands wander through the region, but it is too wild to attract settlers in large numbers.

**The Belt of Pastures at the Foot of the Andes.** Along the eastern foot of the Patagonian Andes is a narrow belt of gravels and sands largely the deposits of former glaciers and the rivers that they fed. The loose material

is drained by clear mountain streams, and upon the valley floors there is rich pasture. North of Punta Arenas, as well as near Lake Nahuel Huapi, the pastures are used to a growing extent (Fig. 11), but in the long stretch between, most of the land is idle because it is too remote from the sea and the railway. Wool and hides cannot be profitably carried over the great distances to the ports. Until railways afford an outlet to the eastern coast of Patagonia men will not be tempted to make their homes there, since they would be outside the currents of trade and obliged to live a rough life, depending entirely upon the country for everything they would need to eat and wear. When railways are finally built the region will develop, but until then it will be one of the idle lands of the earth.

The most common inhabitant of the region to-day is the *incotuco*, a little animal that burrows in the ground like a mole and eats the tender roots of the grasses. Many kinds of birds are found on the great lakes that lie along the mountain front, and the fleet guanaco roams the grassy valleys, almost undisturbed by man.

**The Lonely Settlements of Western Patagonia.** About the headwaters of the Chubut and the Negro rivers in northern Patagonia is a line of settlements of special interest. They have been formed of Chilean and Argentine pioneers who have discovered in these good pastures an easy means of livelihood. The cattle are driven into Chile and also to the ends of railways that extend into northern Patagonia. For example, cattle from Lelejo, far south of Nahuel Huapi, are driven to Neuquen, whence they go by rail to the coast. Although the distance into Chile is shorter it involves crossing the Andes Mountains by way of passes covered with snow a part of the year. Difficult as these conditions appear,



the venture has proved profitable enough to continue to attract an increasing number of new settlers. It is a



Courtesy of the Pan-American Union

FIG. 11. *Lake Nahuel Huapi, Argentine Republic. This is the westernmost extremity of the lake. Here the real pass across the Cordillera begins and the boundary between the two republics is only eight miles distant*

novel sight in the headwater portions of these valleys to come suddenly upon isolated settlements where tufted grasses support flourishing herds. One settler near Los Repollos, at the head of the Nuevo valley, raises horses and sheep as well as cattle and sells his cattle to traders who come into the valley from Chile. Lonely *puestos*, or shepherds' huts, may be seen in the most remote corners and are a sign that the land has been well spied out by the herders, those pioneers of settlements.

**The Welsh Settlers and the Valley of the 16th of October.** The most interesting settlement among these remote people is the group of two or three hundred that lives in the Valley of the 16th of October (Plate IV). It should be explained first that streets, towns, and even

river valleys in Spanish America are sometimes named after important historical dates, and that this curious name has been applied to the valley because it marks the day the settlers reached it. Here in a lovely valley of great fertility is a colony of settlers from Wales. All about are grassy hills which slope gently to the green flats of the valley floor. Cattle and sheep are produced, but the great distance from market is a serious drawback to the further development of grazing. For a time cattle had to be driven some five hundred miles north of Lake Nahuel Huapi before they found a convenient pass across the Andes to the Chilean towns. Direct connection with the outside world is by way of the Chubut valley to the Atlantic, where lives the larger parent colony of Welsh settlers from which those in the Valley of the 16th of October came; and in later years communication has been established across the mountains south of Nahuel Huapi from Junin de los Andes and San Martin de los Andes into Chile (Plate IV).

The way in which these Welsh folk of the Chubut valley came to South America is full of geographic interest. About 1860 some of the mechanics and small farmers of Wales became discontented and restless under the rule of England and desired a home in some other land where they could preserve all their old national customs and language, worship according to their own notions, and be entirely free from taxation. This idea of absolute freedom was born of the liberty the Welsh had enjoyed for centuries in the forests and rough mountains of Wales before their conquest by the English. Their mountain home had bred in them a strong love of independence and, in looking about for a new home where they could be as free as they once had been in the old days, they selected "No Man's Land," or Patagonia, where the Argentine

government in 1862 granted to each family about one square mile of land.

But when the first settlers arrived they were greatly disappointed, for the country appeared wild and barren, the climate was more severe than that of Wales, there were no trees, and the soil gave little promise of good crops. In other places in the Argentine there was better land, but the settlers had no money to buy it, and they would rather live in a wilderness than in a land of plenty and have troublesome neighbors. So they crowded into the narrow Chubut valley, built irrigation canals, and after terrible hardships, of which the world still knows but little, succeeded in raising enough wheat for home needs and even for export. Chubut wheat was once famous throughout the Argentine, but the acreage is too small to make the product important. The chief products of to-day are wool and alfalfa.

In 1881, or about the time that the Welsh settlers began to feel established, "No Man's Land" came into the definite possession of the Argentine and was no longer a neglected territory. Up to that time the Welsh had been relatively free from taxation and had managed their own affairs. Since then Argentine officials have interfered with the once quiet life of the settlers. Military service in the National Guard is required, Spanish must be taught in the schools, and taxes regularly paid. The religious Welsh find military service especially distasteful since the regimental parades are held on Sunday.

Finally, as the people steadily increased in numbers, the valley became overcrowded. Instead of farms a few thousand acres in extent, each family had only a few hundred acres. The Chubut valley became like a hive overstocked with bees. It seemed better for a part of the colony to move out and give the others more room, so

in 1895 a small group moved westward and settled in the "Valley of the 16th of October."

Added to these sources of discontent were the floods which visited the valley in 1899 and again in 1902. At first the great difficulty had been the want of water, not the abundance of it, and when floods came the poor irrigation works were broken down and the valley was covered with water.

Other Welsh settlements have been made near the coast, as at Porto Madryn, Rawson, and Trelew, and with the growth in railways and irrigation works the colonists will become more attached to their new home (Plate IV).

**Railways in Patagonia.** The Argentine government is now building railways into the more valuable portions of Patagonia, and when these are completed the settlers who have already built homes in the region will be much better off and new settlements will probably be made in large numbers. The railway from the mouth of the Negro valley has been extended westward almost to the mountains, about three hundred miles, and it will soon reach the Lake Nahuel Huapi district, rich in resources of soil, water, and climate. Thence the line will extend into Chile by way of the Cajon Negro Pass and branch lines will be built northward to San Martin and Junin de los Andes and southward along the base of the mountains to the flourishing colony of Welsh settlers in the Valley of the 16th of October. These important lines will supply an outlet for rich pastures and still richer farms where the grains and fruits of the temperate zone will be produced in large quantities. Moreover, shorter railways will soon be built from various other points on the east coast westward into the better portions of the country, where settlers may find permanent homes.





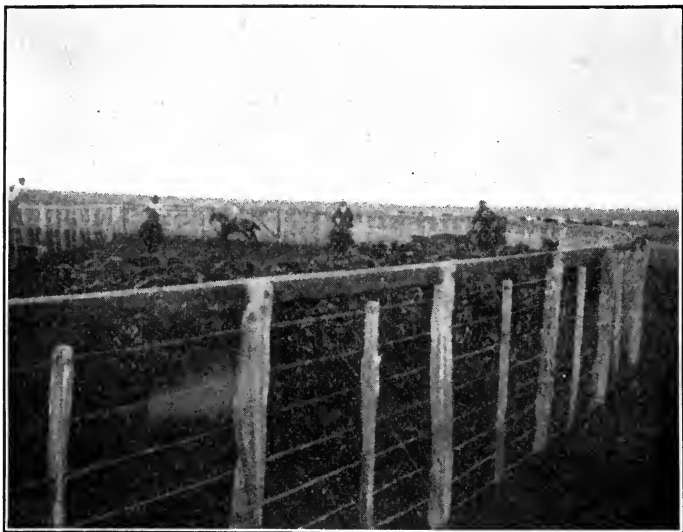
## CHAPTER IV

### THE ARGENTINE

**A Big Country with Few People.** Next to Brazil, the Argentine is the largest country of South America and has the largest number of people. But even this rank means less than one might suppose. There are only a little over seven million people in the Argentine, or only a million more than live in New York City alone. The population of New England is nearly as great as that of the Argentine, and that of Belgium is almost the same. Yet the Argentine is more than a third as large as the United States and only a little less than a third as large as Europe. In thinking about the Argentine it will be worth while to remember that a country may have a great deal of land and yet contain very few people. When the United States gained its independence there were about three million people in it, or about as many as live in Bolivia to-day and about half as many as now live in New York City. We had a great deal of land at that time, but much of it was uninhabited. The Argentine is in that condition to-day; if its more than a million square miles of territory were divided equally among all the people each person would have a farm of about one hundred acres. In the United States each inhabitant would have about twenty-three acres, in France four acres, and in England about one acre.

We must not forget, however, that a country may be small in population and yet have the resources for becoming larger in the near future. Though the Argentine has less than seven and a half million people there is good land that will support millions more.

**Large Spaces for Grazing.** Vast tracts of Argentine territory are covered with grass and are therefore used



Courtesy of Rudolph Schevill

FIG. 12. *Corral at Guayamini, Argentine*

for the raising of cattle, sheep, horses, and mules. Even if all the water that now runs to waste in the rivers that cross the drier plains of the Argentine were turned out upon the land, large areas probably would still be left without a water supply capable of supporting crops. Upon such areas we shall always find the life of the ranch, as on our western plains; their people will always be herders and cowboys; their products will always be sheep, cattle, horses, and mules (Fig. 12).

The number of people that can live on a square mile of even good grazing land is very small. Here are no large crowded cities like those we find in agricultural or manufacturing regions. The population is spread out



over a large area; houses are few and far between; the towns are little more than clusters of houses grouped about a railroad station; wide expanses of land stretch out in all directions with but the thinnest sprinkling of human beings.

**The Vast Pampas.** By far the most important region of the Argentine is that known as the *pampas*, the flat plains that occupy the greater part of the country. The name "pampa" is of Indian origin and was in use when the Spaniards first came to the Argentine. It is given to any open level tract whether it is grass-covered or desert, in a high situation or near sea level. In the Argentine, however, the name is applied to the plains that occupy the central portion of the country. More precisely, the region of the pampas stretches from the Salado River on the north to the Negro on the south and from near the base of the Andes Mountains on the west to the Paraná and Paraguay rivers on the east. So great a tract has many small differences in relief, rainfall, vegetation, and products, but there are also some general features common to the whole region.

Quite the first thing that strikes the traveler through the pampas is their exceeding flatness (Fig. 13). For long distances the eye can distinguish no differences of level; the surface appears to be like the world of the ancients,—a vast plain stretching out to the great world river that encircled the earth. As a matter of fact the pampas are not quite flat. They consist in large part of shallow basins with floors partly covered with salt or sand or lakes of variable depth and extent. For the most part the water of the tributary streams is lost in the sand or evaporated from the surfaces of lakes. Counting large and small, the basins number many hundreds and have important effects on the drainage

and the life of the pampas though they are too shallow to be a prominent or indeed in places even a visible feature of the relief.



Courtesy of Rudolph Schevill

FIG. 13. *Plowing on the Argentine pampas. Cochico ranch, near Guayamini, Argentine. The tufted grass is called "pampa grass" and on it feed the great herds of cattle and the wild guanaco*

The pampas also slope toward the east, a feature due to the way in which they were formed. They are built of alluvial matter, — sand, gravel, and silt carried down from the Andes by the eastward flowing streams. In small part also they are composed of marine deposits formed on the bed of the ocean when part of what is now

land was under the sea. The vast expanses of the pampas are interrupted by a few small mountain ranges. They but serve to emphasize the flatness of the plains around them and are important as the source of streams used for irrigation.

The monotony of the outlook over the central plains is one of the qualities of Argentine scenery never forgotten. A vast expanse of plain stretching away to a flat horizon is the most common sight during a journey across them. Little clumps of eucalyptus trees here and there dot the plain, small clumps grow about the huts of the shepherds, and border the avenues near the houses of the *estancieros* or ranchmen. The headquarters of an estate is marked by a windmill, an almost universal sign of the pampas. Sometimes the monotony

of the view is broken by the brown of a freshly plowed field, or the tasseled green of corn, or a lagoon or swamp bordered by a belt of salt-covered plain and dotted with water fowl that make their home in great numbers on its reedy shores. Once in a while a South American ostrich, or rhea, may be seen stalking along or feeding with a flock of sheep. These and countless herds of cattle are the chief living features of the extensive pampas of the Argentine.

**A Country where Everybody Rides Horseback.** It has been said that the people of the Argentine rest on two feet and travel on four. The remark helps us to understand how very common is horseback riding in this country of flat plains where even the distances from house to house are too great to traverse on foot. Everybody rides, and even very young boys learn to ride the swiftest horses. The managers of the large ranches visit and their men round up their herds and flocks on horseback (Fig. 14); children ride when they visit their playmates at a neighboring ranch house; and the hunter must ride because the game animals of the flat plains can see for long distances and are very fleet.

**Mirage and Cloud Scenery of the Pampas.** Like the prairies and the western plains of our own country the pampas of the Argentine are a constant source of interest to the traveler who sees them for the first time. Their vast expanses are sublime; in the wind and the darkness they awaken in the lonely traveler a feeling of terror; the limitless wilderness of grass and flowers, with its scattered people and its unbroken expanses, is a marvel of plains scenery, with extraordinary changes in color from morning to night. Upon the hot pampas at midday the mirage sometimes produces magical effects. "A patch of plain becomes a lake, a distant thistle field a

forest of tall timber, a dreary marsh a troop of phantom horsemen." (*Keane.*)

The cloud effects are the most marvelous of all the pampa sights. When a thunderstorm comes up, the great bulky clouds are not hidden or half-hidden by surrounding hills as in a rough country; the whole cloud mass is clearly visible moving over the pampa miles away; all the awe of the thunder and the lightning is clear to the senses. Of more delicate beauty are the cloud effects in fair weather. Huge masses of cumulus clouds float majestically through the air, their fleecy white thrown in sharp contrast against the deep blue of the sky. At sunset the pampas are transformed no



Courtesy of the Pan-American Union

FIG. 14. *Argentine cowboy*

less wonderfully than at sunrise. In the softening light, clouds and waving grasses are brought out more distinctly and the west is tinged with delicate tints or bathed in the most extravagant colors.

**The Grasses of the Pampas.** The vast central region of the pampas is peculiar in having a grass cover of nearly uniform quality and of few species. A common sort is that known as pampa grass, which is found in the wetter places, as about the shores of fresh-water lakes or along the valley floors where water is abundant. In the drier portions of the pampas both coarse and fine grasses grow in tussocks separated by a few feet or inches of bare ground or by inferior varieties of grasses and flowers and a few slender herbs and low shrubs. The soft grasses are excellent for sheep; the coarse grasses are the food of the great herds of cattle for which the pampas are noted (Fig. 13).

**The Strong Pampa Winds.** For several hundreds of miles there are no important interruptions to the movements of the air and, once the wind begins, it blows with almost the same freedom as at sea. The south winds, or the so-called *antarctic gales*, are particularly violent. And from the north comes the *zonda*, blowing with great strength at intervals during the winter months (July and August). Perhaps the most violent winds of all are the dreaded and boisterous *pamperos*, which blow from the southwest. For days the temperature will rise with the continuance of the north wind until the air becomes almost suffocatingly hot. Suddenly the wind changes, the southwest pampero begins to blow, thunder and lightning, a gloomy sky, and abundant rain accompany it, and in almost an instant the hot air is swept away before a bracing gale that leaves one shivering where before there was almost tropic heat. If long continued,

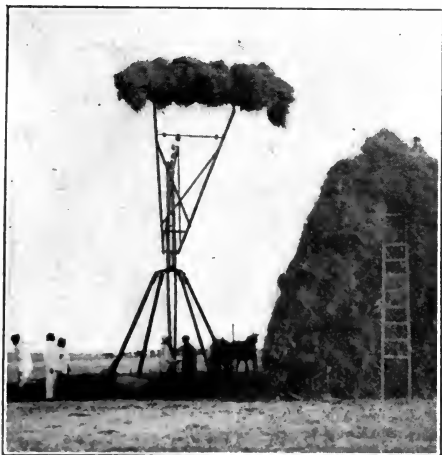
the pamperos do great damage to the cultivated fields of corn. Along the seacoast in the vicinity of Buenos Aires the winds from the sea blow during the southern summer with great strength, often becoming gales that strew the coast with wreckage and blow back the waters of the Rio de la Plata to such an extent as to flood the country far inland.

**Where Farmers Take Chances with the Rain.** Of most serious consequences to man are the droughts for which the dry western plains are well known. They sometimes burn up the grasses and wither the shrubs, dry up the lakes and streams, and turn what was before a profitable range into a land that is half desert.

We shall be able to understand these droughts by first noting the way in which the pampa rainfall is distributed. Plate I shows a gradual increase in the rainfall from west to east, with a maximum in the easternmost provinces of the republic. In the west it is too dry for agriculture without irrigation and man does not depend directly upon rain for the growing of grains and vegetables. The farther east one goes the better become one's chances of raising crops without irrigation, and in the province of Buenos Aires farming on a large scale is carried on without the artificial use of water. The rainfall is reliable, large crops are produced every year, and the farmers are prosperous (Fig. 15). But every few years the edge of the dry belt moves farther east than usual and brings losses to the farmers of that region.

In these respects then the dry border of the pampas of the Argentine reminds us of the plains of western Kansas, Nebraska, and Oklahoma, where droughts sometimes ruin the crops and spread discontent among the farmers. These are the risky places of the earth, where man must take chances with the rain.

**The Prairie Dog of the Pampas.** Late one afternoon a number of horsemen were riding across a sandy pampa toward their camp beside a spring. One was a stranger, who rode a strong beast that galloped far ahead of the rest. Suddenly his horse stumbled and fell over and over, throwing the rider at least twenty feet. When he hurried back to his beast he found both its forelegs broken, and to end its sufferings he was obliged to shoot it. Then, lame from his fall, the stranger walked into camp, where he arrived long after dark. He would have been lost had not the others built a great brush fire as a signal.



Courtesy of W. D. Boyce

FIG. 15. *An alfalfa stacker at work on an Argentine ranch*

The cause of all this trouble was a small hole made by a pampa animal called the *vizcacha*, which is in some respects like our prairie dog. He lives in dark chambers in the loose soil and is on friendly terms with the burrowing owl and other night birds in their underground homes. He may be seen far up in the mountains and plateaus of Bolivia and Chile, where his shrill chattering relieves the mountain stillness, but his true home and the place that he likes the best is the pampa country of the central Argentine. Upon the grassy plains he finds his choicest food

—tender, sweet roots and stems of grasses and herbs. In some places a colony of vizcachas will clear away the grass about the burrows and make an open space where they may play in the sun for hours. When an enemy approaches, warning is given, and all the members of the colony scurry to their deep-chambered holes. In some places the ground is so full of vizcacha holes that a horse is scarcely able to walk, and galloping is quite impossible. The ranchmen despise this little beast, since it not only causes the loss of cattle and horses but also kills the grasses by gnawing off the roots. These, like the other pests which now prevail, will largely disappear with the coming of the permanent settler.

**Birds and Insects of the Pampas.** Waterfowl of many kinds and in vast numbers are found upon the plains, where they congregate about the borders of lagoons. Here are the black-necked swan and the flamingo, wild duck of many sorts, sandpipers, ibises, herons, cranes, and spoonbills. The ornithologist finds here an extraordinary field for the study of the habits, colors, and shapes of the pampa birds. On page 24 is a description of the hunting of the rhea, or South American ostrich, found in great numbers in the Argentine.

It might seem as if those tiny inhabitants of the plains—the ticks, flies, and mosquitos—might go unmentioned, for they are far from interesting things to talk about, but when we learn that there are whole districts where man does not find life endurable because of their presence they rise to the dignity of a great natural force. “They are nature’s miserable castaways, parasitical tribes lost in a great dry wilderness where no blood is; and every marsh-born mosquito, piping of the hunger gnawing its vitals, and every forest tick, blindly feeling with its grappling-irons for the beast that never brushes by,



seems to tell us of a world peopled with gigantic forms, . . . which once afforded abundant pasture to the parasite, and which the parasite perhaps assisted to overthrow." (*Hudson.*) The "gigantic forms" are those mammals and reptiles of huge size that once roamed these plains, whose bones are now found deeply buried by the age-long accumulations of sand and mud out of which the pampas are built.

Hudson has well described the dragon-fly storms that come just in advance of the pampero, that strong southwest wind of which we have already read. Because they are associated with the pampero the dragon flies are called "children of the pampa wind." They fly close to the surface and in such clouds that the air for ten or twelve feet above the earth seems full of them. They rush by with great speed and seek the shelter of groves and forests, where they cling to the trees until the wind dies down. Unlike the locusts (which swarm in like numbers), they do not eat the vegetation but fall upon the ticks and sand flies, "causing them to vanish like smoke."

**How the Pampas Affect Animals.** Out upon the flat stretches of the pampas there originally roamed two animals of exceptional interest, the guanaco and the *vicuña*, cousins of the llama and alpaca. To-day the *vicuña* is found almost wholly in the mountains, but the guanaco still roams the plains, especially in Patagonia. These wary animals are exceedingly fleet and are hunted with great difficulty. Like the wapiti of our western plains, the guanaco has been obliged to develop speed, for the open plains do not enable it to find ready hiding places. This development of speed is no less a response of the animal to the open character of the plains than is the burrowing instinct of the vizcacha which enables it to hide quickly from an enemy.

Even those animals that have been brought to the pampas from Europe have undergone changes in response



Courtesy of Rudolph Schevill

FIG. 16. *Canvas tent on the Cochico ranch, Argentine. The tent is folded up and carried from place to place by the herders who drive the cattle from one pasture ground to the other*

to the nature of the climate and the vegetation of the pampas. Thus there has been developed a pampa breed of sheep having tall, gaunt, bony frames, lean, dry flesh, and long, straight wool like goat's hair. These qualities are far different from those desired, and if the animal by acquiring them has become better able to live happily upon the pampas he has by just

this amount become less suited to man as a source of food and clothing. To keep their stock improved the breeders of the Argentine must constantly bring in new blood from other countries. Some of the animals introduced by man have run wild, such as the dog and the horse; the wild horse, at one time found in great bands, has now all but disappeared.

**The Gauchos.** Like our cowboys of the plains the gauchos of the Argentine live almost entirely on horseback, a free, rough life full of hardship. The imagination of many people who have read about the gaucho a little, and seen him not at all, has played with his qualities and made him a far more courteous and chivalrous hero than he really is. For one must know that not always has the gaucho been free from robbery, and his notions of

ownership of cattle have been based largely on the law of might makes right.

The gaucho lives in a simple hut or in a tent and despises the life of the town; he is accustomed to the saddle from childhood and cares more for the ornaments of silver in the reins of his bridle and for the trappings of his saddle than for the finest house. His eyesight is as keen as that of an Indian; a cloud of dust, the flight of birds, the lie of the grass, are to him signs of man or of an approaching storm; to him the print of a horse's hoof is a subject demanding study, since it may show clearly who has passed by. As a type the gaucho is most interesting, but his day has passed with the passing of much of the free range, and like the cowboy of our western plains he will soon disappear entirely. In his place comes the permanent settler who owns the land on which he lives, cultivates the ground for a living, and herds cattle as well (Figs. 16, 17, 18, and 19).

### The Pampa Indians.

The Indians who once roamed over the pampas have almost disappeared from the central Argentine. When the Spaniards came they found several different tribes living about the borders of the Rio de la Plata and the grasslands to the west and southwest, and so strong were they that for a long time they prevented the



Courtesy of Rudolph Schevill

FIG. 17. *Temporary shelter made of corrugated sheet iron. It is called a "puesto," and when the cattle must be driven to a new and fresh feeding place the sheet iron is quickly taken down and easily set up at the next stopping place.*  
Cochico ranch, Argentine

whites from settling the interior. They were known as Pampa Indians, and were very securely established on the south side of the estuary of the Plata. For over two centuries they carried on marauding expeditions against the outlying ranches from Bahia Blanca to Córdoba. They plundered and even killed the settlers, stealing thousands of cattle which they sold in large part in the Chilean towns west of the mountains. A number of military expeditions were sent out to punish and subdue them, but without success. At last, in 1879, General Roca led a campaign against them which ended in the extermination of whole tribes and in the driving of others into the remote districts of northern Patagonia. Since that time settlements have been made in many places within the territory that the Indians once controlled, and there is no longer any danger from them.

**The Argentine as One of the World's Granaries.** The importance and prosperity of a country may be judged to some extent by the kind and amount of goods shipped out of it. One can scarcely think of Chile without thinking of nitrate of soda, of Brazil without thinking of rubber and coffee, or of the Argentine without thinking of cattle and wheat. The Argentine is one of the important wheat-exporting countries of the world, and in this respect may be classed with Russia, the United States, and India, which are often spoken of as the granaries of the world on account of the breadstuffs they export to the numerous manufacturing peoples of Europe who cannot raise enough for their own use. About one ton of wheat is raised in the Argentine for every man, woman, and child in the republic. Besides wheat the Argentine exports great quantities of corn, linseed, and beef, all of which are shipped to Europe in rapidly increasing amounts.

**A Country with Few Manufactures.** The Argentine

is a land where raw materials are the chief products, and where manufactured articles—the machinery for the



Courtesy of Rudolph Schevill

FIG. 18. *Permanent shelter on an Argentine ranch*

mines, the clothing, knives, guns, and axes—are chiefly brought into the country from Europe or the United States. Manufactured goods are therefore expensive, and any one going to the Argentine will be surprised at the cost of such articles as shoes, linens, revolvers, ropes, and the like. He will find them costing from twenty to fifty per cent more than at home. A sack of grain or a cow or a mule, on the other hand, may be bought for less than the American would be obliged to pay at home, for these, produced in the country, need not be brought in expensive steamers across thousands of miles of ocean before being offered for sale in the markets of the Argentine.

It is surprising to one from America or England, where most of the manufactured goods are made at home, to find that nearly everything used in the Argentine comes from abroad. If one ride on the railway it is more than likely to be behind an American locomotive, and if

one examine the manufacturer's marks on the window catches of the coaches or on the car wheels he will find them made either in the United States or in England. The desks in the business offices, the shoes on the feet of the city dweller, the hat he wears, the carriage in which he rides, the telephone through which he speaks to his neighbor,—all these have been made in France or Germany or the United States or England.

**Cheap Land and Expensive Coal.** One of the principal reasons why the people of the Argentine have had to



Courtesy of W. D. Boyce

FIG. 19. *Croppers at work in one of the great wheat fields of the Argentine Republic*

buy their goods abroad is that there is little coal in the country and in those places where most of the people live the streams have no falls to be used for generating power. Without means for running the machinery which mills and factories require, the people have had to buy their goods from those countries where manufacturing has developed because of a dense population, knowledge of inventions, and a large fuel supply. In the Argentine there are not enough men to do even the unskilled work waiting to be done. Land has in the past been so cheap that the poorest newcomer could find a farm if he only looked far enough, or he could easily find work on the farm of some one who had come before him. Wheat

and cattle could be raised so cheaply that it was easier to farm or to engage in ranching than to start a manufacturing plant, which requires skilled labor and a certain amount of capital. Even if the clothing and the tools brought from other countries were expensive, the farmer could buy them if only the wheat and the cattle with which these were bought could be raised cheaply enough.

**One of the Great Cattle Countries.** A few years ago, before frozen meats were shipped across the ocean, the people of Europe needed more meat; the people of the Argentine had more than they could use. In one place meat was expensive; in the other it was going to waste. Before the frozen-meat trade began, cattle were sometimes of more value for their hides or for the tallow that could be obtained from their carcasses than for the meat they might yield, and tallow and hides were therefore the chief exports from the ranches. The experiment of freezing mutton and beef and shipping it in this condition to European ports was tried with such success that to-day meat in enormous quantities is shipped in this manner.

The first meat-freezing plant in the Argentine was established in 1883 on the Rio de la Plata. In 1884 and 1886 two other plants were opened. In 1883 only seventeen thousand frozen sheep carcasses were shipped out of the country, but by 1901 the total had risen to nearly three million sheep and one hundred and twenty thousand cattle. In 1902 two new companies were started and in the same year a new company began operations with chilled meats. By 1901 the Argentine was supplying nearly sixty per cent of the meat imports into Great Britain, while Australia was second on the list with twenty-one per cent of the imports and New Zealand

third with nineteen per cent. Attention is also being paid to dairying, so that to the meat trade we must add an important though local trade in butter, milk, and cream.

The attention of the people of the Argentine to the grazing industry may also be shown by the fact that the country contains about seventy million head of sheep, or about nine head for every man, woman, and child in the republic; about seven million five hundred thousand head of horses, and nearly thirty million head of cattle. What these figures mean may be judged from the conditions in other countries. Australia is the only country in the world that contains more sheep than the Argentine. Russia and the United States surpass the Argentine in the number of horses; and these two countries and India likewise exceed the Argentine in the number of cattle. By contrast, the Argentine has only seven and a half



FIG. 20. *Straight railway track on the flat plains or pampas of the Argentine. Railways may be cheaply built on these flat plains. There are few cuts or fills, and no expensive bridges*



million people, while the Russian Empire has a population of one hundred and forty million and the United States has a hundred million.

**Railways of the Plains.** Flat plains have the great advantage of being easily crossed by railroads, for there are no expensive bridges to build or costly rock-cuts to make. If the plains are forested the trees must be cut down, but if they are covered with grass a railway may be very cheaply constructed across them. And if there is enough rainfall to support great herds and flocks and farms and plantations the railroad will have much business and both it and the farmers and ranchmen it serves will be benefited.

This condition, so near the ideal, is found in the Argentine. Railways run by the most direct routes from town to town without the many curves, tunnels, and bridges that are required in a mountainous country. There is said to be one stretch of road in the Argentine that for two hundred miles is without an important curve (Fig. 20). No other country in South America has so large and serviceable a railroad system. From Buenos Aires, the railroad and commercial heart of the country, railroads branch out in all directions over the flat pampas and reach far into the western interior, one line reaching Santiago and Valparaiso, Chile.

**Bullock Wagons.** Before the day of the railroad, men could settle out on the plains and carry on farming only so far as goods could be sent by bullock wagons. It was once no unusual sight to see long trains of slow-moving wagons strung out on the great plains of the western and central Argentine, moving toward some spot favorable for settlement. In each might be seen a family of three or four, including children, and all the household furniture, clothing, and food. At night a

stop was made beside a spring; the children would tumble out and help gather brushwood; a roaring fire was built, and around it every one sat, the boys piling on fuel, the men mending the yokes, the women cooking the food. It was hard travel, especially for the children, and sometimes stops had to be made for the relief of the sick. Other wagon trains carried goods from Buenos Aires to the interior. For a long time such important interior cities as Tucumán, Mendoza, and Córdoba were supplied in part by this "ship of the pampas." It was a most laborious and costly way of conducting the business of transportation, and the development of the country was thereby delayed until the railroads came and made it possible for settlements to be established anywhere.

Bullock carts are still used for the local movement of goods from farm to railway or from farm to farm, but they have nearly gone out of use for long-distance traffic. Bullock carts are curious affairs, unlike anything that we know in this country except perhaps the prairie schooner with its covered roof and great wheels. They are two-wheeled vehicles covered with a canopy of cloth to protect the driver and his goods. The large size of the wheels makes it much easier to cross streams and deep ruts. The driver sits on the front of the cart and drives his team with shouts and cries and by the generous use of a whip. In the old-type wagon a pole goad was suspended over the oxen. It was so nicely balanced that with a touch of the hand it could be tilted downward, whereupon the brads on the end of it pricked the oxen and urged them forward (Fig. 105).

**The Railway as a Pioneer.** Once the advantages of the railway became known it was not long before every important town and province in the republic was linked with the capital, and to-day there are about twenty

thousand miles of railways in the country. In many cases the railway was built into new country before there were people in it and before ordinary roads were built. In this way it has often been the pioneer in the settlement of remote districts and a means for the fullest and most rapid development. Though there are great tracts that are still not reached by railways, it must be remembered that cattle can be driven without much difficulty for long distances through free range to the railway. Thus a single railroad serves as a means of outlet for a vast country by enabling the cattle owners to find a shipping point at the end of a drive of a hundred miles or more.

For hundreds of miles the railway from Buenos Aires to Mendoza runs over a flat pampa, with waving grasses or dusty plains stretching out on all sides. At last the traveler approaches a green oasis in whose center lies Mendoza, one of the oldest, most picturesque, and now one of the most important cities of the interior of the Argentine, with tree-lined irrigation canals, fertile gardens, and far-famed vineyards.

Beyond Mendoza the railway has now been extended across the Andes Mountains, and since 1911 it has been possible to ride from Buenos Aires to Valparaiso entirely by rail.

The importance of this railway across the mountain barrier that has so long stood between the Argentine and Chile is very great indeed. It connects the shores of two oceans, the capitals of two neighboring republics, furnishes a means for the cheaper shipment of cattle from the pampas of the Argentine to the mining districts of Chile, and enables travelers and business men to make a short, quick, and comfortable journey across the continent—it is but thirty-eight hours from Buenos Aires to Valparaiso.

It must not be thought that every part of the Argentine has a railroad, for the whole of that vast region called



FIG. 21. *A stream bed used as a road in northwestern Argentine. Laborers are here removing the stones and boulders from a narrow trail, and this is all the improvement that is required to turn the graded flood plain of the river into a graded mountain road*

Patagonia, in some parts of which railways are now being built, was until recently without a single steel rail. There are also vast tracts in the northwestern part of the republic which have no other means of shipping goods from place to place than those afforded for the past three or four centuries—the mule and the burro (Figs. 21 and 22).

**The Region of Mines.** A long railway also runs northwest to the mining districts of La Rioja, Catamarca, and Chilecito in a section of the country more distant still from Buenos Aires. Gold, silver, copper, iron, and nickel are found here in abundance; one town, Villa Argentina, “Silver Town,” takes its name from its chief product, silver. Some years ago all the ore from Chilecito

was sent on muleback to Chile across the deserts and mountains. Later the ore was shipped eastward three hundred miles in carts, and later still a railway was built to the town. The railway now offers cheap means for carrying freight; and the region possesses such rich ore that it has already become the principal mining region of the Argentine.

By no means all the people of the northwestern part of the Argentine are engaged in mining, for those who work in mines must be supplied with food. On the fertile plains at the foot of the mountains irrigation works have been built and the water of the mountain streams turned out upon the land. Where water is available the desert of stones, sand, and cacti is completely and almost magically transformed. Fruits of all kinds thrive, including peaches, figs, pears, and grapes; wheat, wine, and oranges are also produced; here too is a profusion of flowers, especially roses and lilies.

**A Tramway of Rope.** One of the interesting sights of the mining region is the rope tramway that runs between Chilecito and the mines at Upulungos in the Famatina Mountains. The difference in elevation between these two places is eleven thousand feet, and the country is so broken that it was found too expensive to build an ordinary railway. The rope road is twenty-one miles long and carries ore down to Chilecito and supplies of food and machinery up to the mines. There are nine stations along the line of this curious tramway, and at each station the ropes are anchored so that the strain may be divided. The ore cars run on rollers suspended from the ropes, and the weight of the loaded down-hill cars carries up the lighter return cars, though steam engines at intervals along the line also help the movement.

The rope is suspended from iron trellis girders from

ten to one hundred and forty feet high and the spans of rope between girders are from three hundred to three

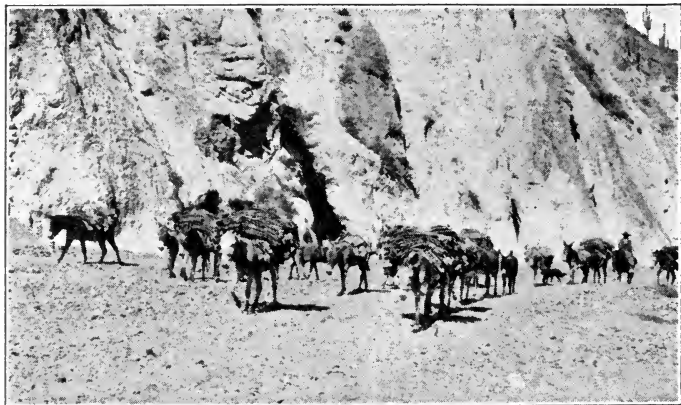


FIG. 22. *Mules bearing packs of sheepskins from the mountains of northwestern Argentina into the valleys*

thousand feet long. The grade of the line is very steep, in places as high as thirty per cent. Most interesting of all is the fact that at one place a tunnel has been constructed as in an ordinary railway, a tunnel fully a thousand feet long.

Watchmen ride the line to prevent theft, for sometimes a thief selects a time when no one is near and with a long pole tips over an ore bucket. On one occasion when it was suspected that a thief was about to steal ore a watchman curled himself up in a bucket and rode down the line. Instead of rich ore the thief tipped out a man, who lost no time in handing the thief over to the soldier policemen camped at the mine.

**A Coach Trip in the Argentine.** To reach places at a distance from the railroad one may ride muleback or occupy a seat in a coach. A coach trip is very interesting to one who has never before traveled in this way. The

coach is a huge covered wagon, very much like the old coaches our grandfathers used to ride in before the days of the railroad. It will carry from twelve to fourteen people, who are crowded three in a seat. Early in the morning, before it is yet light, the coach is prepared, the baggage is strapped behind and on the roof, and eight mules are hitched up in four pairs. The driver, grasping the heavy reins, shouts at the top of his voice, stable boys throw stones or clods at the mules and whip them unmercifully, and away go the mules at a breakneck speed. They gallop along mile after mile, sometimes turning about the curves of a mountain road almost on the edge of a precipice, to the shrieks of the women and the consternation of the men.

By and by the coach arrives at the posthouse, where a stop is made for breakfast and for a change of mules. Four or five stops like this are made each day; and, by using between thirty and forty mules, fifty or sixty miles may be covered between sunrise and sunset, even when the country is rough and the roads crooked and steep, while on the pampas the distance may be seventy or eighty miles.

**The Dry Basin Region.** In northwestern Argentina is the highest and coldest part of the country outside the Patagonian Andes. Two great mountain chains here inclose a lofty plateau known as the Puna de Atacama. Volcanoes and lava flows cover a large part of it, and between them are basins containing salt and borax. Springs are rare, and as a rule the streams do not flow the whole year round. Some of the lakes shown on maps as occupying the lowest places in the basins are not lakes at all except in the wet season. In the dry winter season they are either covered with fine grasses and rushes, or with clay, salt, magnesia, or borax. For example, the Laguna

del Portezuelo, shown on some maps as a lake sixty to seventy miles long and eighteen to twenty miles wide, is in winter a feeding ground for sheep and llamas, and one may ride across it from end to end. A few scattered houses have been built above the high-water mark of the wet season, but the dwellers have a hard time finding enough water for their domestic needs.

The same winter dryness prevails farther south. The



FIG. 23. *Pastoral nomads with flock of sheep and goats on the eastern border of the desert of Atacama*

Laguna de Guatayoc and other lakes are really grassy plains in the dry season, except for a central area where salt deposits take the place of the grasses. Some of these immense salty plains look very much like great inland seas. The mirage is almost always to be seen at midday; troops of vicuña appear to be standing up to their knees in water when they are really feeding on the grasses; mounds on the plain appear turned upside down; and a sand drift looks like a shimmering pool.

**The Llama Herders.** Here and there in the north-western basins of the Argentine one comes upon a native



hut, a wretched thing of mud and grass, less than twelve feet square and six feet high. The dependence of the people upon the llama is seen in the corral which is always built near the hut and in which the llamas are herded every night for fear of the puma that makes his home in the mountains near by. The llamas feed upon the coarse, spiny, rushlike grasses as well as on the finer grasses mixed with them. Llamas and sheep form the chief food of the people as well as their source of clothing to protect them from the winter cold of the plateau. The highest pastures are used only in summer. When the winter cold comes on the shepherds leave their temporary huts and drive their flocks down to the lower valleys (Fig. 23). They are therefore migratory shepherds, though none of them are true nomads since they have fixed homes for both seasons of the year.

The constant tending of their flocks and the immense amount of walking this makes necessary have made the Indian herders great walkers and runners; their speed and endurance are truly marvelous. A man will take a message two hundred miles and back in six days for about thirty-five cents a day and provide his own food. Once a man carried a telegram forty miles to the station, received an answer, and brought it back, eighty miles in all, in eighteen hours, for the trifling sum of eighty cents. Even children are excellent walkers and have great endurance. They learn to tend the flocks almost from babyhood, and not uncommonly one may see a tiny lad of four years herding a flock of big llamas.

**Buenos Aires.** We have only three cities in the United States that are larger than Buenos Aires. A remarkably large portion of all the people of the country, about one fifth, live in the capital city. None of the other cities even approach this one in size. Indeed, if we should put

together all the other cities of the Argentine that contain more than six thousand people we would have a city only from one half to two thirds the size of Buenos Aires.

The gathering of so many people into a single town is usually deplored by those who believe that the inhabitants of a country should live on the land. While it is in part true that the policy of landowners to live in the city and leave the management of their great estates to superintendents does not favor the best use of the land, there is an advantage in the unusual growth of the city population. The close association of so many people has stimulated the growth of the national spirit to a degree far beyond that which the people would otherwise have developed. The Argentines have become proud of their chief city and willingly endure heavy taxes that it may be made beautiful, healthful, and comfortable. A great city will support good newspapers, theaters, and public buildings, wide, clean streets, comfortable street cars, and electric lights.

These are the signs of civilization, to be sure, and not the substance of it, but in the enjoyment of these things the Argentine has become broader minded, his ingenuity has been stimulated, and he has been taught to regard his country as one with great opportunities and with a great future. The army and navy maneuvers are the delight of thousands of sight-seers, and pride has been created in the military branch of the government. Buenos Aires has in this manner become a force that is felt all over the country and without which the seven and a half millions of Argentines would not form the strong nation that they are to-day.

**Buildings and People.** There is in the city of Buenos Aires none of the natural beauty that forms so large a part of the attraction at Rio de Janeiro (p. 230) or

La Paz (p. 152). There are no encircling mountains, no island-studded bays, no charm of tropical vegetation. The city is laid out in a monotonous chessboard fashion on a level plain fronted by the wide La Plata estuary, like Chicago on the shore of Lake Michigan. The attractiveness of the city lies partly in the cleanness of its wide streets, the beauty and size of its great public buildings, its parks, and in its business facilities. One of the interesting places of the great city is the water front, where the ships of many nations come for flour and wheat, cattle and sheep (Fig. 24). The Mercado Central de Frutos (Fig. 25) is the largest wholesale produce market in the world. Palermo Park, one of the seventy-two parks in the city, has running streams, pretty lakes, and long avenues of beautiful palms.

Like many other South American cities Buenos Aires has large numbers of foreigners. It is said that there are more Italians in Buenos Aires than there are native-born Argentines. And there are at least a hundred thousand



FIG. 24. *One of the basins in the harbor of Buenos Aires. So crowded is the shipping that vessels are often required to lie three or four deep on the borders of the artificial basins.*

Spaniards. Nearly every principal tongue is spoken and each language has its newspapers. It is a curious fact



Courtesy of W. D. Boyce

FIG. 25. *A scene in the Central Market, Buenos Aires*

that the largest Spanish-speaking city in the world should be located not in Spain but in America. Buenos Aires is almost twice as large as its nearest rival, Madrid, though it should be remembered that of this population there are people of many nationalities other than Spanish.

**The Lights and Buoys of the River Port.** The port of Buenos Aires has many disadvantages in spite of the vast anchorage grounds which the wide estuary affords. The so-called Rio de la Plata is really an immense shoal estuary and the depositing ground of the great Paraná River (Fig. 26), which annually sends to the sea nearly fifty per cent more water than the Mississippi. So much sediment is constantly carried down this great river that the delta of the Paraná is rapidly advancing into the La Plata estuary and in time will fill it completely unless a better means is discovered for disposing of the sediment.

Remarkable changes are shown in the position of the forty-mile front of this delta on the ninety-two different maps of it dating from 1529 to 1885.

The government has been working for many years to improve the estuary for navigation and to accommodate the constantly increasing size of the merchant ships. Luminous buoys have been placed in the river all the way from Buenos Aires to the mouths of the Paraná, the Bravo, and the Iguassú rivers. A floating semaphore, an instrument that tells the navigator the depth of water in the channel by night as well as by day, has also been installed for the benefit of navigation. So important is a knowledge of the height of the water in the rivers tributary to the La Plata that the Argentine government surveys them constantly and every year makes new maps for the river pilots. The government each week makes a forecast of the depth of water in the various channels based on the study of gauges that record the height of the water, and all the stations are connected by telegraph.



Courtesy of W. D. Boyce

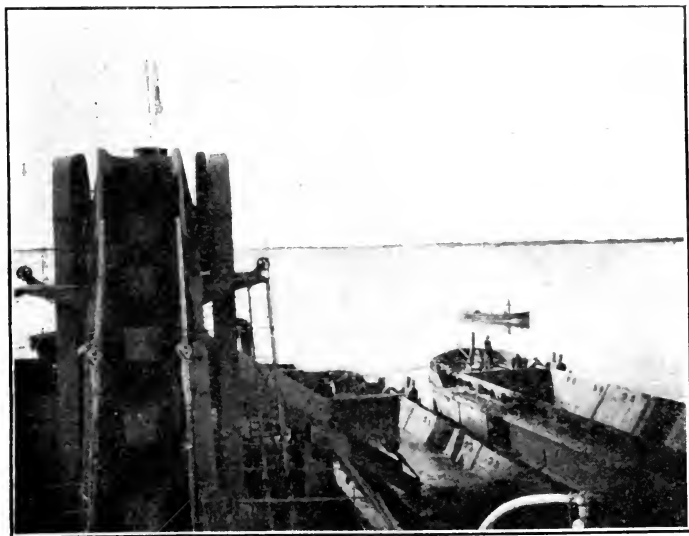
FIG. 26. *Scene on the Paraná River*

Sometimes the shifting rivers play queer tricks with the work of man, as in the case of the ditch of a market gardener some thirty years ago, opposite Ibicuy River. The ditch had been dug so that the gardener might take his canoe by a shorter course to the main channel, but when the next flood came the river overran the ditch and deepened it to a channel, and now ocean steamers pass through the "Canal del Mercador," or the "canal of the merchant," on their way down from Rosario.

It was in 1885 that the government first began the construction of docks at Buenos Aires. Before that time all the business was done from an anchorage about twelve miles from the city. Passengers and goods were transferred from ships to lighters and from lighters to small boats and finally to great wheel carts that went out long distances from shore. The north channel which leads to the docks that now front the city is five and a half miles long, three hundred and thirty feet wide, and at low tide allows vessels having a draft of twenty-one feet to enter. When the tide is high (the tidal range is only a few feet at Buenos Aires) vessels drawing twenty-seven feet of water may enter. There are only twelve ports in the world having a greater tonnage than that at Buenos Aires, and none of them has had such an extraordinary growth in so short a time (Fig. 24).

**Other Ports of the Argentine.** A large part of the business of the Argentine is transacted outside of Buenos Aires in spite of the exceptional size of that city. Among the ports of the republic, Rosario is second and is the outlet for a wide area of rich grain-producing country in the province of Santa Fé. The port is located on the west bank of the Paraná and has the advantage of a deep-water channel to the edge of the high bank that there overlooks the river. The elevated position of the

city enables the easy loading of grain vessels, the chutes of the elevators down which the grain slides by gravity connecting directly with the holds of the grain ships. Expensive port works, including docks, warehouses, and elevators, have also been constructed. With the improvement of the river so that its channels shall be wider and more stable the port of Rosario has a still greater future (Fig. 27). Though located far up the Paraná, it receives ocean-going vessels and thus saves the high cost of a long haul by freight train. The chief exports are corn and wheat, for which the position of the port is admirably adapted. Among the other exports are metals from the mines of the north, hides from the pastures of the



Courtesy of Rudolph Schevill

FIG. 27. *Dredging a channel in the Paraná River near Rosario. The constant shifting of the sand bars makes it necessary to dredge the ship channels almost constantly so that navigable channels may be maintained. Note the low, flat banks in the distance. These are characteristic of the Paraná and the Paraguay*

Paraguay, and alfalfa from the grasslands west of the city. German, Swiss, and Italian immigrants have



Courtesy of W. D. Boyce

FIG. 28. *Bird's-eye view of Paraná, Argentine Republic*

founded settlements in the country roundabout and have built permanent homes.

Below Rosario are other cities of growing importance, such as Villa Constitucion, San Nicolás, Zárate, Campana, and San Pedro, while above Rosario are the ports of Diamante, Santa Fé, Colastiné, Corrientes, and Paraná (Figs. 28 and 29).

**The New Harbor at Bahia Blanca.** On the bay of Bahia Blanca, where the Atlantic coast of the Argentine makes a great curve to the west, is the harbor and city of Bahia Blanca (White Bay). For a long time this town was of little importance, but it has recently become a center of commercial interest, partly on account of the crowded condition of the port of Buenos Aires, partly also because of the improvement of the port of Bahia Blanca and the development of the surrounding country. Argentines are fond of speaking of it as the Liverpool of the south, though this name it bears more because of its future than because of its present commerce. But a



future it will certainly have, for the Argentine coast has only a few really good natural ports, and among these Bahia Blanca ranks high. The harbor possesses spacious accommodation for the largest ships and an entrance so narrow as to be easily defended in case of war. The railway systems are being put into better connection with Bahia Blanca and have already turned in that direction a great deal of commerce from a region which was once tributary to Buenos Aires.

**A Seacoast Country without a Fishing Fleet.** With all its long stretch of Atlantic coast, the Argentine has not a single important fishing station. In some places the reason for this condition is easy to see, as on the coast of Patagonia, where the tides are so high that fishing operations would have to be carried on under extreme difficulties, though this will not explain the condition everywhere. There are excellent fish in the sea and a ready market for them in the coast towns, but a race of fishermen has not yet been produced nor are the new settlers fisherfolk.

The lack of a fishing people in the Argentine Republic is felt in the development of the navy, whose sailors are



Courtesy of W. D. Boyce

FIG. 29. *General view of Corrientes, Argentine Republic*

not drawn largely from fishing districts, as in other countries, but from the army, the National Guard. New and cheap land close to good markets has been so easily obtained by the incoming settler that he has found no attraction in fishing.

**The Flooded River Country.** The two great eastern streams, the Paraná and the Paraguay, are of much importance to the people of the region they drain and are the only natural highways of travel and trade. In their lower courses both rivers have a very uncertain behavior. The Paraguay is especially unreliable. For the most part it runs in an alluvial bottom as wide as the English Channel. In the season of flood all the bottom land is submerged, cut-offs occur, sand banks form and reform, and the whole course of the main stream may be found to have been changed when the floods subside. During the season of high water, which is three months of the year, the river country is so completely flooded that only groves of trees stand as islands above the swamps and lakes that border the main stream. Down this ever-changing channel the trade of the Chaco of Bolivia must find its way, and, capricious as the river is, it enables man to enter the country by boats for more than two thousand miles above Buenos Aires.

**The Grasslands of the Paraná Valley.** While a large part of the Paraná region is tropic forest, there are also vast savannas where the richest pastures are to be found. These lie between the open flats of the Paraguay River and the forested valleys of the upper Paraná. They commence in scattered pastures upon the hills of central Paraguay and run in widening extent northward along the Maracayú to Cuyabá, where they merge with the grasslands of the sandstone plateau of Matto Grosso that forms a part of the great interior plateau of Brazil.

The upland pastures afford grazing for live stock during the greater part of the year, but in the dry summer months the flocks and herds must be driven down to the lowlands, where they feed upon the young tussock grass and wild grain.

The unoccupied grazing lands of Matto Grosso and Goyaz alone cover an area as large as the state of Texas and possess a grazing value fully equal to that of Texas. The value of the grazing lands accessible to the markets that use cattle for the frozen-meat and jerked-beef trade has risen in recent years because of the rise in the price of cattle. There is in consequence a steady stream of squatters passing northward by way of lower Misiones and Paraguay. They drive troops of mares, mules, and horses, and carry their household goods and women. At Posadas they pass at the rate of two hundred a month. They come from the regions farther down the valleys where for many years they were permitted to "squat," that is, use the land without really owning it or paying taxes or rent to any one, but from which they were obliged to move because the real owners of the land no longer allowed them on it. The owners of the lands whence the squatters are being driven have found their land suddenly valuable because of the steadily growing importance of the frozen- and chilled-meat industry in the Argentine and Uruguay.

Thus, remote as these grasslands are from the sea, they are after all far more valuable than the forest lands of the upper Paraná which lie much nearer the sea, for man can travel about in grasslands, can produce cattle upon which to depend for food and money, and find a climate far more healthful than in the damp forests. Even the wood of the grasslands is more easily obtained than that of the forest where it grows in such abundance.

The scattered groves and belts of timber along the water courses are easily reached and the timber may be taken over an easy route as compared with the difficulty of carting it through a jungle. With railways and wagon roads the lands most available for colonization are those located along the fringe where the forest ends and the plains begin, for here are both timber and pasture, as well as a climate that makes diversified farming possible.

## CHAPTER V

### THE VALLEYS OF CENTRAL CHILE

**The Yankees of South America.** The people of central Chile live in the cool zone of South America where the climate is pleasant (Plate III). It is neither so hot as to weaken a man through disease nor so cold as to require all his energy to procure a food supply. The effect of these climatic conditions has been to make the people of central Chile very energetic. In spite of its small size Chile is one of the most important countries of South America. Its army and navy are the pride of every Chilean and compare very well with an equal number of the armed forces of Germany or the United States. The beautiful Chilean horses are as good as may be found anywhere and give the cavalry a fine appearance on the Sunday parades that are held throughout the year. In the war with Peru in 1879-1883, Chile quickly overcame the small Peruvian navy, defeated one army after another, and at last took Lima and held it until the end of the war. To see a battalion of the Chilean army go marching down the streets of Santiago is to see one of the finest military sights in South America. A troop of cavalry in Chile is able to parade or fight with much the same vigor and success as a troop of the emperor's guard in the days of Napoleon or von Moltke.

The energy of the Chileans is shown in many other ways than those relating to the army and navy. The industry and ingenuity of the people are exhibited in their schools and colleges, their railroads and wagon roads, their streets and parks (Fig. 30), their everyday business, and their relations with their neighbors. The Chileans are well aware of their own progressive qualities and are so proud

of them that they call themselves the Yankees of South America. To them the word "Yankee" means a person of



FIG. 30. *Central plaza at Copiapo, Chile*

energy and ingenuity, and, as they use the word, it also means a wide-awake citizen of the United States. They admire the way in which the United States has prospered; the energy that we display has always been a matter of interest in South American countries.

**A Long, Narrow Country.** A more peculiar distribution of national land cannot be found than that in Chile. Think of a country so long that if one end of it were placed upon New Orleans the other end would reach the Arctic Circle, and yet so narrow that one could cross it in a few days on foot. The widest place is at the Strait of Magellan, where it is two hundred and fifty miles from east to west; the narrowest part is near Hanover Island, where it measures but sixty miles across. The total area of Chile is three times that of Illinois and Indiana, but the length of the country is equal to the distance from Alaska to southern Mexico. Its shape and size have been determined partly by war and conquest but

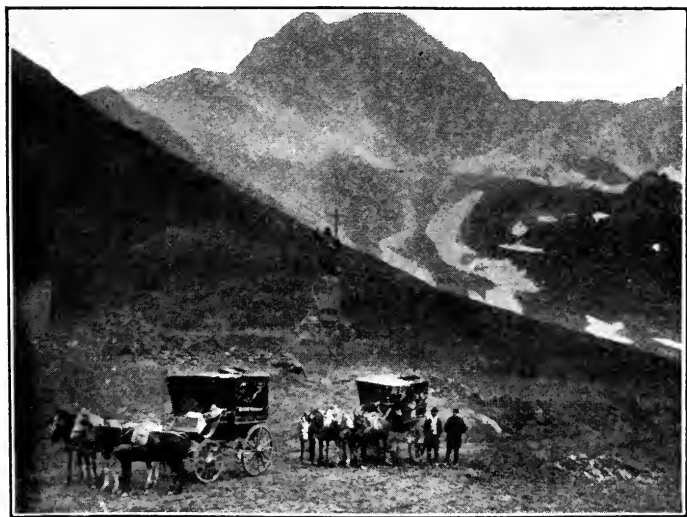
more largely by its position on a narrow strip of country between the lofty Andes Mountains and the sea. Lofty mountains are difficult to pass. People visit them for the grand scenery they display, but few live in them, as a rule, for, if we except mineral deposits, thin pastures, and possibly a little timber, they are without resources to attract men.

The Andes Mountains that confine Chile to the seacoast are among the few really lofty highlands of the world. Aconcagua is perhaps the loftiest mountain in the western hemisphere. Its peak reaches up into the region of eternal snows, attaining an altitude of over twenty-three thousand feet. Aconcagua lies on the boundary between Chile and the Argentine. North and south of it are ranges and groups of lofty volcanic peaks whose bare, cold surfaces repel the settler and the traveler alike. A vacant region such as this is an ideal boundary between nations. There are as a rule no close neighbors whose rights or quarrels may bring two governments into dispute and possibly into war with each other. Neither are there likely to be natural sources of wealth to cause difficulty.

Yet Chile and the Argentine have in the past had several serious arguments and threatened wars over boundary claims. The boundary treaty between the two republics says that the boundary south of the 40th parallel must follow the principal peaks and divides between the east- and west-flowing streams. These are, however, so irregular that the words of the treaty are not always easy to apply. Some of the Chilean rivers have cut clear through the mountain range and now head on the plains east of the mountains, a region that the Argentine has always claimed. The trouble became acute a few years ago, and both sides prepared for war. Fleets were

made ready, soldiers drilled, and both nations became very much inflamed by warlike speeches. At last better counsels prevailed. Surveyors were employed to study the country thoroughly, and the King of England decided the case on the basis of the survey. Both sides accepted his award, and to commemorate the peaceful settlement there was raised on the divide between Chile and the Argentine a colossal statue of the Christ. It was cast from old Spanish cannon left there about eighty years before. On it is this inscription: "Sooner shall these mountains crumble into dust than Chileans and Argentines shall break this peace which at the feet of Christ, the Redeemer, they have sworn to maintain" (Fig. 31).

**The Valley of Paradise.** The Spaniards explored the



Courtesy of the Pan-American Union

FIG. 31. "Christ of the Andes." Monument erected on the boundary line between Chile and the Argentine Republic, after a boundary quarrel that once threatened war



desert coast of northern Chile in ships built at Panama—tiny caravels which, beside the ocean liners of to-day, would look like the boats of children. They coasted southward, hundreds of miles, and for most of the way were in sight of a stern desert coast. At last they came to the end of the desert. They had reached the northern edge of the belt of westerly winds in Chile where the more constant rains support a covering of green vegetation. So overjoyed were they at finding themselves once more in a land of trees and green grass that their enthusiasm was intense, especially when they reached the first green valley, which they called the "Valley of Paradise," or as it is spelled in Spanish, "Valparaíso," to-day the greatest commercial port of Chile (Fig. 32).

**The Fertile Valley of Central Chile.** The land beyond the desert which so delighted the eyes of the early Spanish explorers is now often known as southern Chile. Strictly speaking, it should be called central Chile, and such we shall designate it here, for the real southern end of Chile is composed of islands and peninsulas without number, and although it is wooded and has an abundant vegetation it has actually fewer people to-day than has an equal area of the desert of Atacama in northern Chile.

Central Chile is wholly different from the northern and southern extremities of the country since it lies between the two extremes of heat and aridity on the one hand and cold and heavy rainfall on the other. This seems indeed a "valley of Paradise" when its mild climate, fertile soil, and refreshing rains are compared with the harsh conditions one finds in the regions on the north and the south. This is the part of the country that attracted the earliest settlers, and here we find the great majority of Chileans to-day. Although central Chile embraces but one fifth of the entire country, it contains four fifths of the people.

There is but one inhabitant to every two square miles of country in northern desert Chile, and less than that number in the south, but there are seventeen to each square mile in the central section.

In the central section of Chile are almost all of the schools, colleges, and universities of the nation, the great cities and railways, and many of the ports and manufacturing plants (Fig. 33). This is also the land of the gardener, the farmer, and the herder. In this section are produced a large part of the grain and hay shipped north for the animals employed in the mines and the nitrate fields of the desert. Here are raised the animals which are purchased in great numbers and shipped north, the cattle for meat and the horses for draft animals. Wheat and corn are produced in great quantities, and steel and flour mills have been built.

Upon the mountain sides where the land is too steep for cultivation, and the soil too thin, are pastured great



Courtesy of the Pan-American Union

FIG. 32. *Monument to Prat y Bahia, Valparaíso, Chile*

droves of sheep and herds of cattle. It is here that we find the ranchmen of Chile. Their flocks and herds go

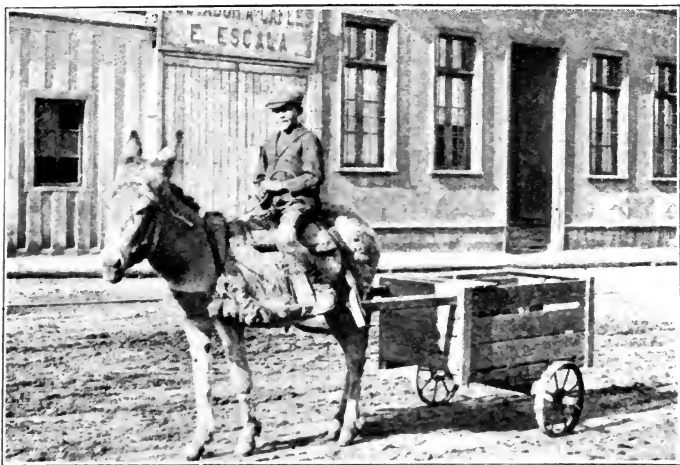


FIG. 33. *Street scene in central Chile*

far up into the mountains in summer, when the lower pastures are withered or scanty, to graze on the short rich grasses nourished by the winter rains and snows; in the winter time they are driven down into the valleys. Some are slaughtered for food, others are shipped into regions where cattle are not kept, still others supply milk, butter, and cheese in very limited quantities to their owners, or to the people of the towns.

Central Chile also produces large quantities of wine, and the lands which support this industry are of great extent. In the central valley south of Santiago there are miles upon miles of vineyards (Fig. 34). During the grape-gathering season the vineyards are dotted with grape pickers. It is the busiest and happiest season of the year, with singing and dancing every evening. The harvest gathered, the manufacture of the wine begins. It is

made in almost numberless varieties, stored in bottles and casks and prepared for shipment. All Spanish-speaking



FIG. 34. *Vineyard in central Chile*

peoples are addicted to the use of wine, the most common of the social beverages. Its universal use means the support of the wine industry not only of Chile but of the Argentine as well, and in addition great quantities of it are imported from California, Peru, France, and Italy.

**The Scenery of Southern Chile.** In clear weather the southern end of Chile is the most picturesque part of the entire country. Lofty mountains border a steep, irregular shore. At the extreme southern end of the region it is so cold that there are numerous snow fields feeding glaciers that in places extend far down the mountain valleys and even to the sea. At the Strait of Magellan, which belongs to Chile, the mountain-bordered shore is a marvel of coastal scenery. On the lower slopes are dense forests of beech and oak, higher up are the stunted alpine plants of the zone of cold, while the peaks and crests of the mountains are without vegetation of any sort, the surface consisting either of bare, cold rock or of snow

fields. The contrast between dark forest and white snow and ice, between green sea and blue or gray cloud-covered sky is one of the charming aspects of a view which is perhaps the most striking and certainly one of the most beautiful in all South America.

The bold coast and the fine scenery of the Strait of Magellan extend with some variations for several hundred miles northward. The shore is island-fringed throughout. So numerous are the islands and islets that even the government officials who have surveyed and studied many of them do not know exactly how many there are. That there are thousands upon thousands is however well known. Between the islands and the mainland are great numbers of channels, straits, and bays, all very deep, for these islands represent the tops of mountains whose bases are far below the level of the sea. When one sails about the islands he sails about mountain tops, not in air as one might sail about mountain tops in a balloon or an airship, but on water in which the mountains have been half drowned. There are few good beaches; the shore consists rather of bold cliffs or steep mountain sides upon which the sea has as yet done but little work.

Everywhere throughout the region are dense forests of beech and oak. So close do the trees stand, and so rank is the growth of leaves, vines, and underbrush, that one appears to be in a tropical rather than a temperate-zone forest. The dense growth is due to the heavy rainfall. The sky is almost continually overcast; rainstorms are of almost daily occurrence. It is stated that in some places over two hundred inches of rain fall every year. Some people who know the region well, speak of it humorously as a place where it rains thirteen months in the year and where men become web-footed! Naturally people

have not been attracted to the region, and government officials at the extreme south are given half time off with full pay. Some lumbering is now carried on in a few places, but as a whole the region is without an important population,—a wilderness of intricate waterways, primitive forests, and picturesque mountains.

Any country is fortunate which has important deposits of coal to run its railroad trains and factories. South American countries are as a rule unfortunate in having little or no coal. Brazil and the Argentine, the two largest countries, are obliged to import all the coal they use, and it is very expensive. In this respect Chile is more fortunate. Large deposits of good coal (soft) occur in the provinces of Arauco and Concepcion. Coronel, Lota, and Valdivia, south of Santiago and Punta Arenas, on the Strait of Magellan, are the principal coal centers, though development is active at only the three first named. By far the larger part of the coal used in Chile must be brought from other countries—chiefly Wales and Australia; and the use of coal is rapidly increasing. Between 1903 and 1907 the consumption of coal doubled. The home production is still too small (about a million tons) greatly to affect the price. A ton of soft coal costs from eight to ten dollars in gold.

From 1860 to 1864 Chile was the greatest copper-producing country. Its annual output was then from sixty to seventy per cent of the total output of the copper mines of the world. The copper districts of that day, at Copiapó and Coquimbo, were the richest and most progressive in all Chile. Thus in 1851 the first railway in Chile was built from the port called Caldera to the town of Copiapó in the center of a rich copper and silver region. One of the first theaters in

Chile was built at Copiapó (Fig. 30) at about the same time. Chile is still a large copper-producing country but it is no longer the first. At Chuquicamata in northern Chile there is a whole mountain of copper ore only a hundred miles from the coast. The ore will be excavated in open pits by steam shovels and transported over a special ore railroad to the coast, where it will be smelted. The product will be distributed among northern countries, chiefly by way of the Panama Canal. Copper will soon be produced by the millions of pounds and at a very cheap rate, since no expensive mine timbering or tunneling and blasting will be required. Southeast of Santiago, at Braden, are other deposits almost equally extensive, and many of the old mines, of which there are hundreds, are still producing important amounts of ore. Next to nitrate, copper is the most important mineral production of Chile. The total exports of the country are valued at nearly ten million dollars.

## CHAPTER VI

### THE COASTAL DESERT OF CHILE AND PERU

#### **A Long, Narrow Desert between Mountains and Sea.**

We have already seen that South America has the southernmost people in the world, the Yaghans and Onas of Tierra del Fuego, and the southernmost city in the world, Punta Arenas. It has also the loftiest large lake—Titicaca—twelve thousand five hundred feet above the sea; the largest river, the Amazon; and one of the longest deserts, the so-called west-coast desert. The length of this desert exceeds sixteen hundred miles, a distance as great as from Chicago to the Arctic Ocean or from the equator to Florida. Yet its width is in few places more, and in most places less, than a hundred miles. One can cross it in two days of hard riding by mule caravan, but the coast steamers generally spend from two to three weeks between Payta, Peru, and Valparaiso, Chile, the two extremities of the desert.

**The Features of a Desert.** A desert is popularly regarded as a place where no rain falls—a lifeless plain of yellow sand. As a matter of fact there is no rainless desert upon the whole earth; and while many deserts have vast, flat, sand-covered plains, all deserts have hills and valleys as well. It is a common mistake to suppose that deserts are without inhabitants, for while some parts of all deserts are truly deserted, there is no known desert wholly without people. It is also noteworthy that the life of all deserts is highly specialized: the plants have thick bark or leaves, or hairs, thorns, and deeply penetrating roots; the animals have sharpened senses and adaptations for sustaining life with a limited supply of



water; and the primitive people of the desert generally have interesting ceremonies which they believe will bring rain.

There are within the borders of the west-coast desert of South America mountains from fifteen thousand to eighteen thousand feet high, hundreds of thousands of people, and a large variety of plants and animals that find food and shelter in its valleys and plains. More-



FIG. 35. *Sail-car on the Antofagasta-Bolivia Railway near Calama, Chile. The men push the car out to their work in the morning and at night raise the sail and blow back into town*

over while the west-coast desert is often described as rainless, some rain actually does fall. The amount is never great, and while one spot may have several showers a year a neighboring spot may be without rain for many years. Since it never rains on the moon a traveler has suggested that in parts of the west-coast desert where no rain has fallen for many years, curious people, who wonder what the moon's surface would look like, might get a very fair notion of it.

The west-coast desert owes its origin to the mountains and the winds. The lofty Andes shut off the moist south-east trade-winds or break them up into a complex system of shifting winds that follow the trend of cross valleys and ridges (Figs. 35 and 36). Furthermore, the moisture of the trades is deposited on the eastern slopes of the Andes

and the westward-moving air descends upon the coastal region so dry that no rain can fall from it. The eastern slopes are therefore clothed with dense forests; the western slopes are so dry as either to support no vegetation at all or only low shrubs, mosses, thin grasses, and cacti. If the region were not in the zone of the steady trades the wind would blow for several days at a time from the sea and rain would fall where now the desert prevails. More rain would fall also if it were not for the cold Humboldt Current near shore. This cools the air over it to so low a temperature that when, as in the afternoon, the wind blows for a few hours from the sea to the land, it is heated by the land about as much as it is cooled by rising on the flanks of the coastal mountains. There would be a desert here even if the Humboldt Current did not exist, but the cold current makes the aridity more intense.

The west-coast desert receives the equivalent of a slight rainfall from the almost constant mist that hangs like a cloud bank over the edge of land and sea. The

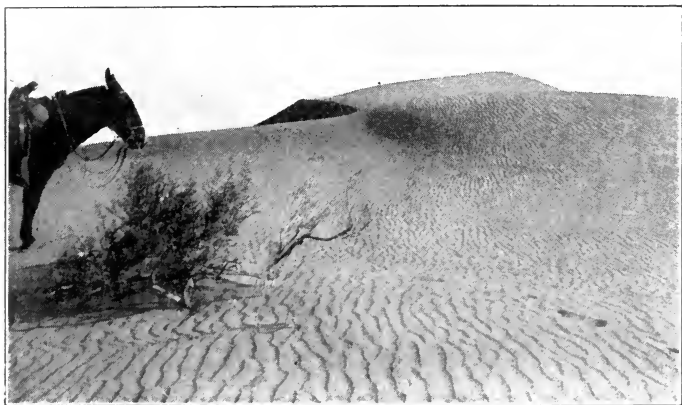


FIG. 36. *Wind ripples on the surface of a sand dune, Atacama Desert*

natives say it is the "poncho," or cloak of the sea nightly drawn over its head. Water particles from the mist



FIG. 37. *A caravan starting on a journey across the desert of Tarapacá*

cover are collected upon the leaves and stems of plants and a small quantity is also absorbed by the soil. From these slender sources enough moisture is derived to nourish a small number of plants. The amount is generally small, but in some places, as at Mollendo, Peru, it is enough to support grasses upon which feed a considerable number of mules, donkeys, goats, and even cattle. East of Antofagasta a small oasis is maintained by this means and enough moisture collects in the spoon-shaped cactus leaves to supply the goats with the little drinking water they need. Where the coastal mountains are higher, as for example east of the port of Camaná, Peru, there is some rainfall during the southern winter; and at intervals of several years it is fairly abundant. In contrast to the surrounding desert the mountain slopes are here covered with a thick carpet of grass and flowers. Hundreds of cattle are driven to the rich pastures from near and far to grow fat before the returning sun dries up the soil and withers the grasses.

**Desert Travel and "Signs of the Way."** In such a dry desert as that on the west coast of South America it is difficult to travel any distance from the railroads that

tap the larger valleys, the nitrate fields, and the mines. One must carry all one's food or depend upon the



FIG. 38. *A mountain trail in the Maritime Andes in northern Chile. A heap of stones called "signo del camino" guides the traveler in those places where the trail is hidden in the sand*

very uncertain supply which can be found in small, scantily watered oases on the way. The view (Fig. 37) of a caravan or pack train crossing the desert of Tarapacá in northern Chile shows not only how lifeless part of the coun-

try is but how well provided the traveler must be with the necessities of life. These men are beginning a journey of several weeks and have brought along not only bedding, tents, fuel, and heavy clothing for the cold nights, but also food of all kinds in tins, vegetables from the nearest oases, and enough drinking water to last them until they reach the next spring. They travel with an Indian guide who knows the way from one camp site to another. If darkness overtakes them too far from a village, and they do not wish to travel all night, they camp in some sheltered spot and sleep on the bare ground. Their guide curls up under a bush or in the corner of a stone corral and has no covering but a thin

blanket, though in the mountains east of the desert, whither the travelers are bound, he is at times buried in snow when he wakes.

The trails of the desert are in many places covered with sand and difficult to find, so that signs of the way, called *signos del camino*, are

erected. These are nothing more than heaps of stones piled beside the trail and so large as never to be obscured by sand (Fig. 38). Some of them are of great size, each traveler adding



FIG. 39. A wayside cross on one of the desert roads of northern Peru

a stone or two that he may have a safe journey. If the *signos* are on a mountain pass the Indians sometimes leave beside them small offerings to their deities, such as a candle or a piece of meat or some wool, to bring good luck. Once in a while one may see erected over a heap of stones a cross bearing the inscription "INRI," which means, "Jesus of Nazareth, King of the Jews" (Fig. 39).

Fig. 40 shows four parties of desert travelers pitching camp beside a pool of water. A dead mule shows on the left. The water on the right is covered with a green scum and is salty, but it is all that may be had within many miles. After a long, hot ride it is better to use water like this than make a "dry camp," for without water it is impossible to eat dry food, which only increases one's thirst.

**From Tropic Forest to Barren Desert.** Of all the interesting features of the west coast of South America none is perhaps more lasting in the mind of the traveler

than the startling suddenness with which he comes upon the coastal desert in sailing south from Ecuador. The



FIG. 40. *Pack trains and desert travelers making camp beside a desert pool*

last port at which the steamer touches before reaching the desert is Guayaquil. There may be seen every sign of abundant and timely rains. The hill slopes behind the city are green with foliage, there is abundant pasturage for the cattle and mules outside the town, and the banks of the Guayas River are deeply fringed with dense tropical vegetation. The next morning the scene has changed completely, for in a single night one has passed the boundary between "the desert and the sown." At the northern end of the great coast desert of South America there are practically no streams, for the region is nearly rainless; there is so little vegetation that at a distance the landscape seems bare and yellow; in place of herds of cattle as at Guayaquil one sees here only a few small flocks of scrawny goats that somehow pick a scanty living from the dry and extremely tough vegetation that survives the desert dryness.

**A Typical Desert Port.** The first port of call for vessels southward bound along the ocean border of the desert is Payta, a typical desert port (Fig. 41). It lies in a bend of the Peruvian coast and is built at the foot of the bluffs that border the shore. There are nearly always a few vessels at anchor in the harbor, receiving and discharging cargoes of merchandise including rice, clothing, and implements. A railway leads eastward out of the town, and there is an air of business and importance about the place quite foreign to the sterile desert about it. One looks in vain for any sign of vegetation, yet there are fine vegetables in the market booths. Surely the desert does not supply the great packages of skins taken on board

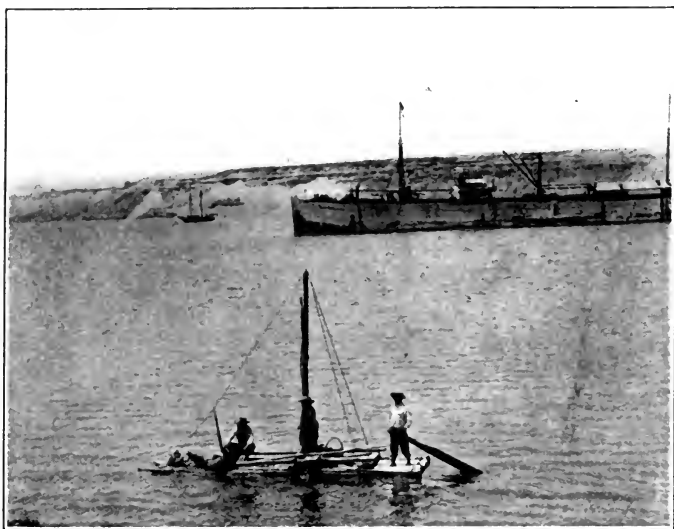


FIG. 41. *A British steamer with Chinese rice at Payta, Peru. The small raft in the foreground is a "balsa," used for making short trips along the shore and in sailing out to meet an incoming steamer. It is made of bamboo and is very light. The ocean here is so quiet that no storms ever occur and even a small boat is safe*

the steamer! Large quantities of rice and cotton are shipped abroad, but where are they grown? How does such a small port maintain such an important trade?

**The Nile of Northern Peru.** Our questions will be answered if we but follow the railway leading toward the interior. A few hours' ride across a barren and almost lifeless plain of sand and we arrive at Piura, one of the most interesting cities in all South America. Upon it depends almost the entire prosperity of the port of Payta. Up and down the far-famed valley of the Piura River are the plantations and farms of the people, with irrigation ditches leading the water of the river out upon the fields where rice, sugar cane, and especially cotton are grown. Without the life-giving river all would be dry and barren. What the Nile is to Egypt, what the Indus and the Ganges are to the people of India, so in its small way is the Piura to the people of northwestern Peru. Small wonder they regard it with a feeling akin to reverence.

**A Feast Day for a River.** It is not surprising therefore that the people of Piura have a great feast day on account of the river. Once a year when the mountain snows are being melted and the summer rains return, the sources of the Piura are fed with precious water. The river gradually rises as the flood moves downstream, spreading over and enriching the valley bottom and feeding the irrigation ditches that in turn water the fields. Long before the flood arrives the people ask every traveler from upstream where the river is and how fast the flood is coming, and in this way they learn when the river will arrive.

On the day when the beneficent river is due the people of Piura, men, women, and children, usually about five thousand in number, march upstream in a body to meet



and welcome the river. This is the great *fiesta* or feast day of the year. With fife and drum they escort the river down to the main bridge of the town, some miles below Piura. At Catacaos (south of Piura) more than five thousand people take part in a similar feast and with much rejoicing welcome the river to their fields and gardens. Upon this muddy, silt-laden, and sluggish stream, not at all beautiful to the eye, depend the welfare and prosperity of a great many people. The river is to them, in a sense, a harvest. If there is abundant water there will be abundant food; if there is little water some of the people will suffer want.

**Rain Once in Seven Years.** The people of Piura have another source of water supply besides the river. Once every five or ten years there are a few showers, for which the people eagerly wait. They are called the seven-year rains. While they do not occur quite so regularly as every seven years they are, after all, tolerably regular in their appearance. Every few years the equatorial rain belt which waters the country north of the desert, where such abundant vegetation may be found, migrates farther south than usual and brings a few showers to the thirsty land, causing a most wonderful burst of life. Everywhere the faint green tinge of the short, quick-growing grasses may be seen, fragrant blossoms of many flowers fill the air with sweetness, and for a few weeks a barren country becomes beautiful. By the end of that time the water has evaporated or sunk underground, the hot sun shrivels the grasses and flowers, and once more the region has become a yellow desert. Fig. 42 shows a street in Payta where fruits and vegetables are sold and where many people come and go. It is but a stream channel adapted to the purposes of a street. One would not think it a very safe place for a street, but as it rains only once in

five or ten years people using it are seldom inconvenienced by running water.

**The Best Cotton in the World.** It is a familiar fact

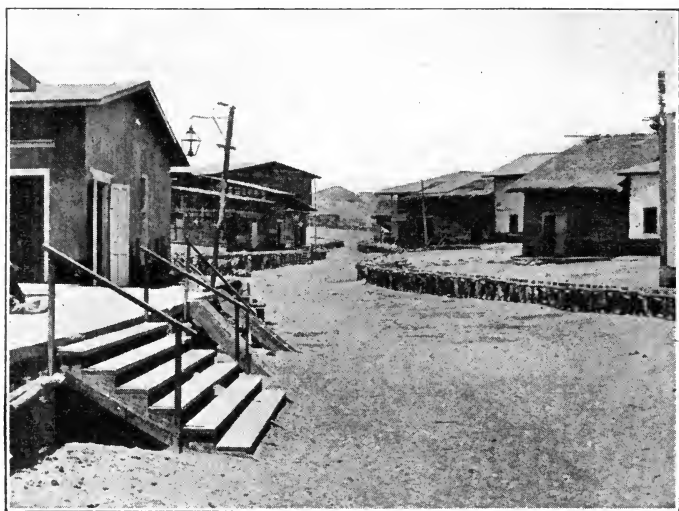


FIG. 42. *A stream channel in Payta, Peru, used as a street. As it rains but once in seven years at Payta, the people are not often troubled by the running water that keeps the channel open*

to, people who are well acquainted with the habits of plants that differences of soil and climate from place to place result in certain differences of qualities, either of color, or size, or taste, in a given plant. Thus the famous Havana tobacco leaf is produced only in western Cuba. Likewise certain exceptionally good brands of coffee and certain kinds of cotton can be produced only in special places. Piura is noted for the kind of cotton grown in that remarkable valley. "Piura cotton is known among cotton merchants for the peculiar strength of the long fibers," which gives it a high value. The market price of Piura cotton is nearly twice as great as that of the ordinary

kind grown in the United States or in India. It is eagerly sought for use in making special grades of cotton cloth and for mixture with wool.

**Goat Herds of the Piura Valley.** The famous Piura cotton is, however, not the sole product of this fertile valley. A great deal of sugar cane is grown also. It is not all used as we use it here, in making sugar and molasses. Some of it is eaten raw, or rather, sucked after chewing, for the natural sweet sap it contains. Since sugar cane stands transportation very well it is bound into bundles and taken on the backs of burros and mules across the desert to many other towns where it is not produced, and there sold as a delicacy. Goats are also raised for their skins, which bring about two dollars apiece, delivered on board the steamer.

Goats are peculiarly adapted to the desert because they are able to live upon very poor and dry food which would otherwise be lost because no other animal would

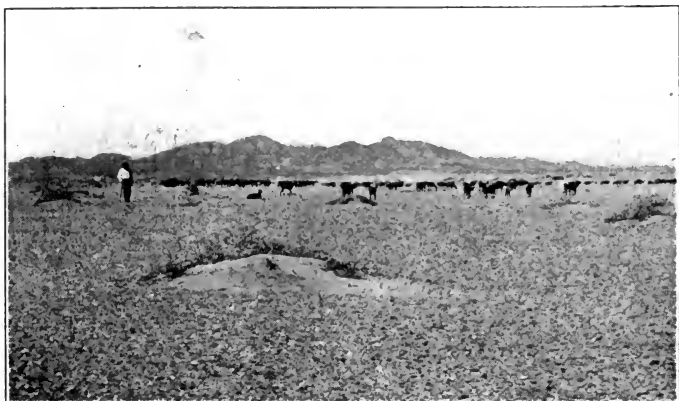


FIG. 43. *Flock of goats and shepherds at Payta, Peru, at the northern end of the Desert of Atacama. They feed on the tough desert shrubs that grow here and there in clumps in the sandy waste*

or could eat it. They browse upon the very dry resinous shrubs of the desert, eating the softer parts; consume great quantities of the bean of the *algarroba*, a kind of locust tree; and feed on such waste parts of barley and other forage crops as ordinary animals refuse. They are also herded upon the desert, where they range in flocks that scour the yellow plain in search of food and that are sometimes several weeks without water (Fig. 43).

**Other Desert Ports.** The steamer sailing south along the coast of Peru stops at many desert ports and at each, one sees as at Payta very much the same relation between the port on the arid coast and the fertile interior valley watered by a mountain stream. Fig. 44 represents the port of Salaverry, whose harbor, like all those on the desert coast of Peru, except Callao, the largest and best of them all, is little more than an open roadstead. If this

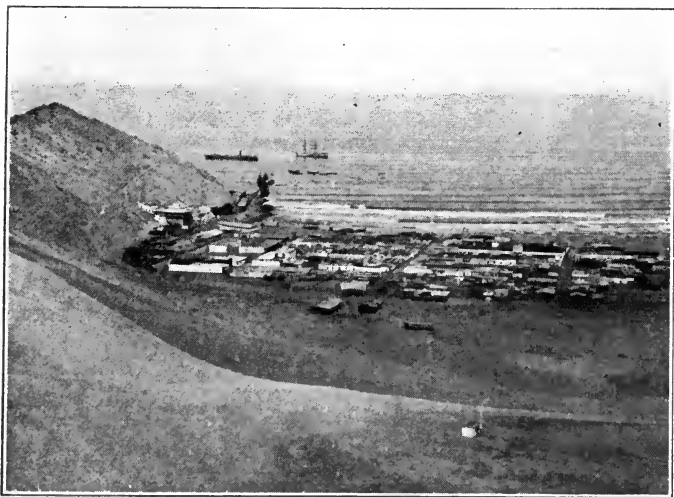


FIG. 44. *The port of Salaverry, Peru. Nothing at all grows in the town; but a few miles north of it is a fertile valley which supplies the port*

were a stormy sea like that off the coast of southern Chile or the eastern coast of the United States it would be one

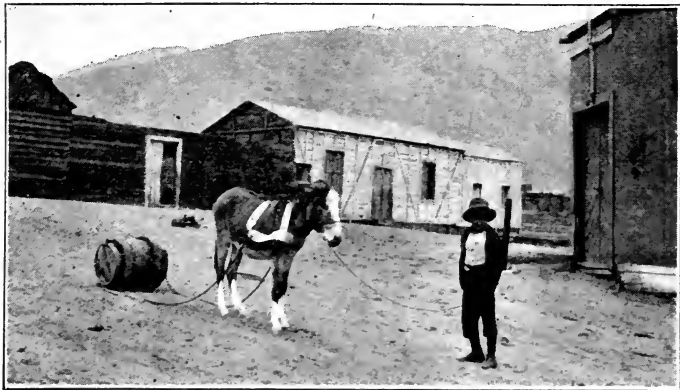


FIG. 45. *Hauling water at Taltal, Chile*

of the most dangerous in the world. Mariners find scarcely any natural protection for hundreds of miles. There are no deep bays or sheltering promontories, almost no islands behind which ships can seek shelter and outride a storm, and but few lighthouses,—a bold, harborless, shelterless coast.

But few storms ever ruffle the surface of the Pacific in the latitudes of the coasts of Peru and northern Chile. It is a serene and beautiful tropical sea. For this reason the early Spanish navigators called it "Océano Pacifico," which means the peaceful, calm, or quiet ocean. The only motion of its waters is a smooth and constant roll, increasing in size as the shore is approached. The surf is heavy and landing in small boats is very difficult, and in places even dangerous. Steamers and sailing craft therefore anchor some distance from shore, and discharge their cargoes into lighters called launches that are rowed to a steel mole or wharf that extends into the sea.

In the port of Taltal, Chile, the city reservoir is located on a hill, and pipes are run down from it to convenient



FIG. 46. *Hauling water from railroad to mines, Chile*

stations in the city. To these stations people must come for their daily water supply. Some carry it away in buckets, others in two-wheeled carts, and still others in barrels to the ends of which axles have been fastened that rotate as the barrel is pulled along by a donkey or a mule. Fig. 45 shows a boy on his way to a water depot, and since he must travel down hill, and the barrel is without a brake, it is with great difficulty that he can prevent it from rolling on to the heels of the donkey, thus causing it to be broken to pieces by the kicking beast. He leads it skillfully from one side of the street to the other on an angle with the descent, and on the return not uncommonly the donkey is obliged both to pull the water barrel and to carry the boy. In Fig. 46 we have the water wagons of the coastal mines coming out to the railroad for a water supply. The mines are twelve miles away, but every drop of water must be transported from the railroad, where tank cars



controls the distribution of farms and therefore of cities and ports in the coast desert of Chile and Peru. The

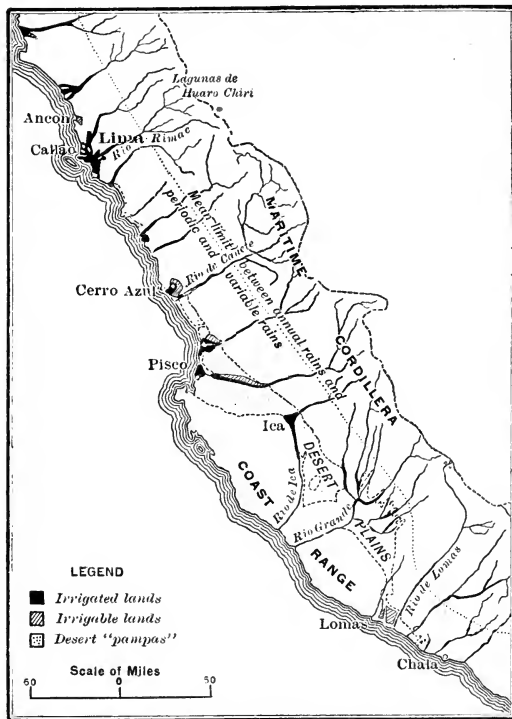


FIG. 48. *The central coast region of Peru. In the northern part of this region the mountains come down to the coast and the irrigated lands are near the valley mouths*

black areas, representing the irrigated tracts, are regularly arranged along the coast between the mountains and the shore. Whenever a stream of any size comes down from the Cordillera, there men have settled on plantations and ranches. Every port in Peru is either at a valley mouth or connected

with a valley by rail. Though the total extent of the valley lands is not large—but ten per cent of the coast region—the people regard them as the most important part of their country for, excepting the mines, there are almost no other sources of wealth. The valleys (Figs. 50 and 51) have a large part of the agricultural wealth already



developed in Peru; they contain all the large cities of the coast region and most of the population.

**Trade of the Coast Valleys.** So widely separated by useless desert tracts are the coastal valleys of Peru that land commerce has less importance than the trade carried on by sea. A

few caravans journey from valley to valley, occasionally there is a traveler, often a prospector looking for mineral wealth, but these total a very small number yearly. These route is preferable to the trails, for it is cool and much

more speedy. Yet even by sea there is not a large traffic from valley to valley. Trade requires dissimilar products which people may exchange for their common benefit, and since almost all the valleys produce more or less cattle, sugar, cotton, rice, and vegetables, the trade among them is supplemented by a more important trade between all the valleys, as a group, and the United States, France, Italy, Germany, and England. These countries manufacture cloth, tools,

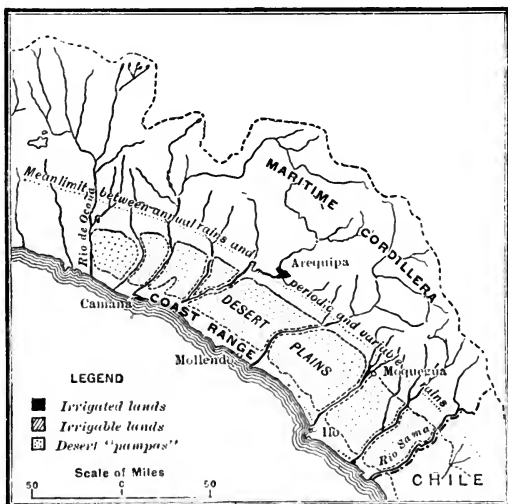


FIG. 49. The southern coast region of Peru. Most of the irrigation is near the western foot of the mountains. Large, arid pampas, or flat dune-covered lands, lie between the Andes and the Coast Ranges

machinery, canned goods, shoes, and other necessities, but all of them do not produce cotton, rice, and sugar in

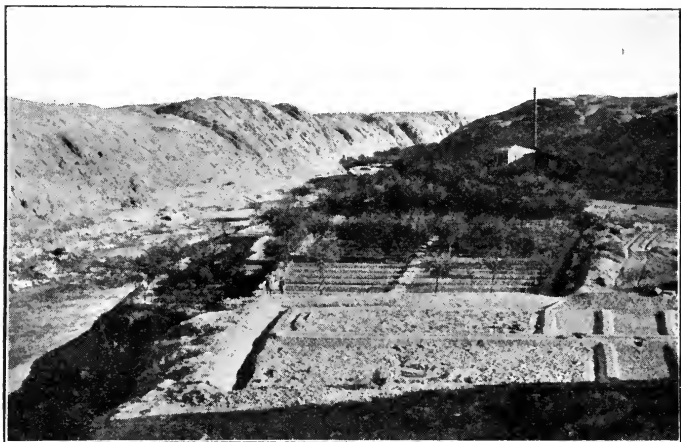


FIG. 50. *View of an irrigated garden in the Loa valley at Santa Fé, northern Chile*

sufficient amounts for the uses of their people. So they exchange their manufactured wares for raw products to the satisfaction not only of themselves but of the people in the coastal valleys as well.

Steamers and sailing vessels leave the ports of Europe and America, round Cape Horn or pass through the Strait of Magellan, and thus reach the coast of Peru, a voyage more than eleven thousand miles long. The coastal valleys of Peru are also in touch with the world through the ocean carriers that stop at their mouths in passing between the great ports of Europe and western North America. German steamers of the Cosmos line go from Hamburg to Vancouver and Seattle by way of the Strait of Magellan, and return, trading at all the principal ports on the way, a voyage at least six months long. The routes of many steamers will be changed now that the

Panama Canal is opened. Commerce between Peru and the rest of the world will be more easily carried on. Except Ecuador, no other country of South America will profit so much through the use of the canal.

Fig. 41 shows a steamer which has just entered the port of Payta with rice from *China*. She belongs to a *British* firm but is manned by a *Japanese* crew and has been chartered by *Japanese* merchants for trade with *South America*. The people of Piura grow a great deal of rice, but it is of such excellent quality and sells at so high a price that it is exported to Chile and Europe and cheap rice is imported from China for the poorer classes.

**A Straw Boat on the Ocean.** In the same view (Fig. 41) may be seen one of the curious boats which some of the people of the Peruvian coast employ for fishing or for

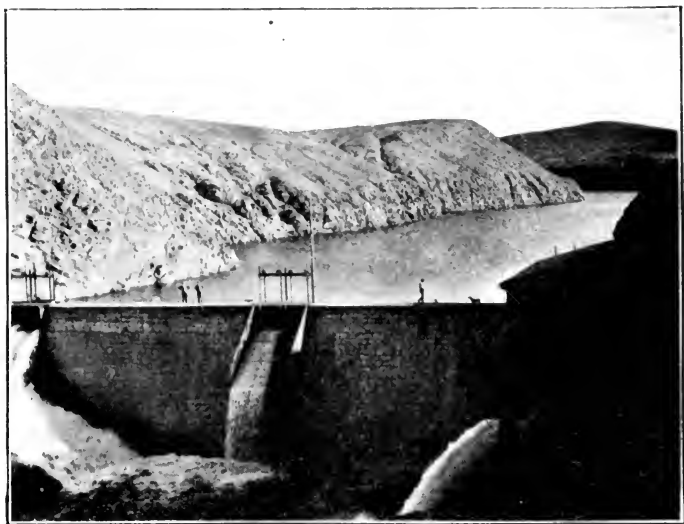


FIG. 51. Dam in the Loa valley near Santa Fé, Chile. Large turbines have been installed and power is generated for running the nitrate "oficina" at Santa Fé

making short voyages along the coast. It is made of bamboo logs lashed together and propelled by a sail fastened to a single mast. A rough board serves as a rudder or as a scull when the wind is unfavorable. Another kind of boat, still more curious, is made entirely of braided straw and is so light that the owner can carry it under his arm or on his back without the least trouble. When the Spaniards came to Peru in 1532 they found the Indians from the coast valleys sailing these queer craft in considerable numbers. Upon them they brought out vegetables and ornaments of gold, silver, and cloth to the Spanish caravels. In his light boat the fisherman puts out into the surf, watches the waves closely, paddles with all his might on the back of some unusually high wave, following it seaward, and soon is beyond the reach of the surf. Often he is submerged under a huge wave, but he is seldom overturned. When his craft becomes wet the fisherman draws it up on the hot sunny beach, where it soon dries out.

**Seaport and Capital City.** The commercial life of Peru centers at the port of Callao, seven miles from Lima, the capital city. Here are gathered vessels from nearly every large country in the world. Lumber schooners from Washington and Oregon; merchantmen from China and Australia; coal vessels from England and Wales; freight ships from France and Italy; German steamers with general merchandise, and American steamers from San Francisco and New York. The flags of nearly all nations are represented. A harbor is afforded in the lee of the San Lorenzo Islands, a half mile off shore. Besides its natural advantages Callao has many artificial features, a deepened waterway close inshore, and modern warehouses, docks, moles, and hoisting machinery. These facilities are, however, quite too few in number and the

harbor nearly always contains vessels waiting their turn at the docks.

**Lima: the Mecca of Peruvians.** In one of the remote valleys of the Andes a traveler once met a Peruvian who cared for his beasts and offered him shelter for the night. After supper they fell to talking of travel, whereupon the Peruvian remarked that all the trails of Peru lead ultimately to Lima, the largest and most important city in the country. Many of his neighbors had spoken of the hope that some day they might visit this wonderful city as he had done when he was still a young man and as he hoped to do again. Just then some ragged shepherds passed by the door of the hut, and seeing them he said, "Think of it, those poor people have never seen Lima!" Farther on, the traveler came to a lonely telegraph station kept by the only white man in the place. The polite manners and well-dressed appearance of the operator were in striking contrast with the drunken people about him. Asked if he was born in this wretched town, he drew himself up and in a manner quite indescribable on account of its extreme pride and dignity, he answered, "No; I am from Lima."

Lima is indeed an interesting city, no less because of its long and romantic history than its beautiful plazas and cathedral, its clean streets, and the wonderful view from the hill of San Cristobal out over the red-tiled roofs, the surrounding gardens and their irrigating canals, the distant port of Callao, and the long, curving, desert coast (Fig. 52). In the cathedral are relics of great historic interest that take one back through centuries; while in the schools, and especially in the new School of Mines, are found the most modern machinery and bright young students. It seems very odd at first to pass from so modern a school as that in which modern mining methods

are taught to a children's school where every one studies aloud and where it appears as if the most diligent students are those who make the most noise!

When we remember that the greater part of Peru is unsettled country because it is covered with forest, or because it is situated at too high an altitude, or is too rocky or dry, and that the towns are for the most part small and squalid (Fig. 54), it is easy to understand why Peruvians think so highly of Lima. Once he has

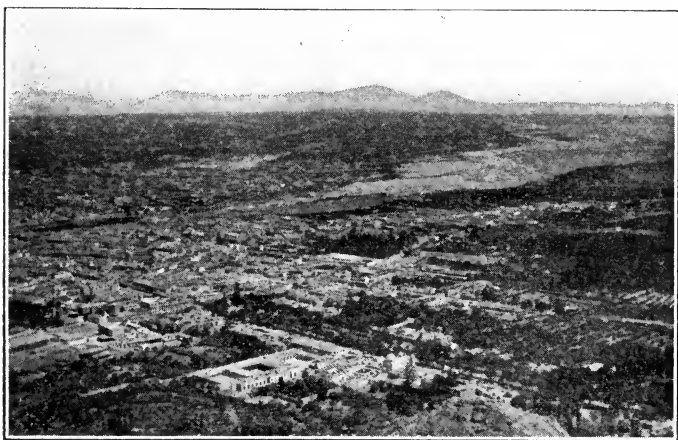


FIG. 52. *A general view near the city of Lima, Peru, from the top of San Cristobal, a hill back of the city. The broad white band on the right is the flood plain of the river Rimac*

known the life there every Peruvian dreams of Lima and longs to return to it. With its electric cars, its attractive restaurants, its well-kept shops and busy people, it is a modern city of great interest and well deserves its place in the affections of the Peruvians.

As in all Spanish-American cities, the central plaza, an open square in the heart of the town, is a matter of great pride to the people, and is usually kept scrupulously

clean and as beautiful as the resources of the town permit. Here the people congregate on evenings when the band plays, and promenade in great numbers. This is everywhere a very important and to the visitor a most interesting social event. The plaza is also well lighted, as in every town of importance, and is flanked by public buildings and churches, and the largest shops and hotels. It is a favorite meeting place for friends and an excellent observation place from which to view the frequent religious processions and military and civic parades.

**The Highest Mountain Railway in the World.** At Lima we become aware of the second great industrial interest of Peru. Next to agriculture in wealth-producing power is the mining industry. The mines of Peru are rich and numerous, and it is at Lima that the business of the mines centers. From here too are exported the products of Cerro de Pasco (Fig. 66), one of the richest and most famous mines in Peru. To reach these mines from Lima one passes over what is perhaps the most remarkable railroad in the world, the celebrated Oroya line. Its construction was one of the great engineering feats of the nineteenth century, and a journey over it is a novelty in railway travel.

The train climbs slowly up the Rimac valley and from the cars one looks out over beautiful irrigated orchards, gardens, and farms (Fig. 52). Soon the train enters the mountains, the grade steepens, the irrigated farms disappear, bare rock and mountain slope come into view. The mountains become more and more rugged; the train rumbles over bridges, roars through tunnels almost without number, climbs worm-like along steep mountain sides where one may look down thousands of feet into the adjacent valleys, and at last reaches an elevation of 15,585 feet, the highest point on any railway in the

world. Profound chasms and inaccessible mountain peaks succeed each other so rapidly in the view that it is with difficulty one realizes that man is able to conquer such a wilderness of rock. Its builder, Henry B. Meiggs, has been called the king of railway constructors, and a ride over the Oroya railway convinces one that he well deserves the title.

**The Mines of Cerro de Pasco.** The Cerro de Pasco mines (Fig. 66) are owned and operated by Americans. Electric lights are installed throughout, the machinery is the very latest and best, and skillful engineers are employed. But were they not so rich it would be impossible to operate them. The high cost of transportation over a difficult road, the importation of machinery from distant countries, and the scarcity of workmen combine to make their operation expensive. To all these difficulties is added the effects of the high altitude upon the workmen. At this great elevation (14,280 feet) the atmosphere is so thin that at each breath one draws in only half as much air as at sea level. The effect is *soroche*, or mountain sickness, marked by headache, dizziness, and nausea. Some people become accustomed to it to a certain degree, and others cannot remain even for a week. But the metals found here in such abundance are desired in the world's shops and factories and, in spite of all these difficulties, men find it profitable to work the mines. Each year they produce large quantities of copper and silver, besides smaller amounts of tin and gold.

**A Railway across Peru.** The port of Mollendo south of Callao is second in importance in Peru, and is the terminus of the great railway that crosses the coastal desert (Fig. 53) and the Andes Mountains and connects La Paz, the capital of Bolivia, with the sea. Like



the Oroya railway, this line is a great piece of engineering work. It crosses a belt of desert country, and when

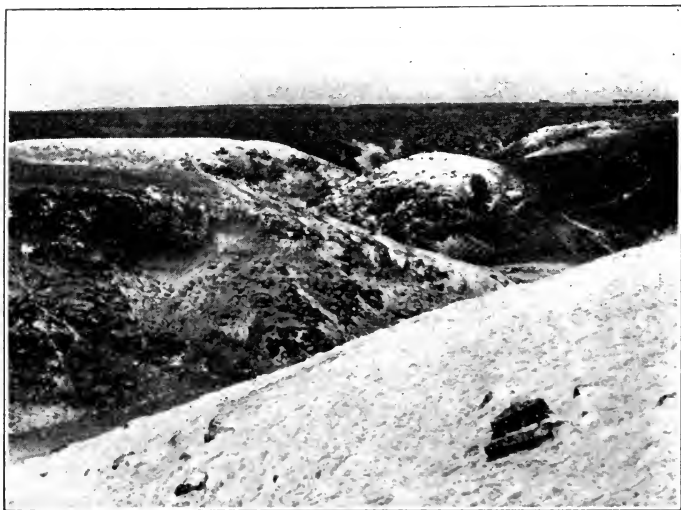


FIG. 53. *White sand drifts in the desert of Atacama near Mollendo, southern Peru*

this part of it was being built all water and food had to be brought to the workmen and the animals; it traverses a lofty and rugged line of volcanic peaks and a high plateau, reaching an elevation of 14,666 feet at Crucero Alto; it connects at Puno and Guaqui, two ports on Lake Titicaca, with steamers that sail the loftiest large lake in the world; it follows a most difficult and tortuous course and was constructed at the expense of many lives, for to the heat of the desert was added the cold and snow and mountain sickness of the highlands.

For twenty years (1872-1892) the Southern Railway of Peru was the only railway outlet of Bolivian commerce. It is still one of the most important commercial routes

in that country. Over it are shipped to Mollendo a good part of the tin, copper, and silver of the mines, the wool of the flocks of llamas and sheep, and rubber, cacao, and hides from the eastern forests and grass lands of Bolivia and Peru. It is by this route that machinery for the mines and railways, clothing of all sorts for both whites and Indians, candles for private houses as well as for Catholic cathedrals and churches, canned goods for travelers as well as for the city dwellers, lumber for houses, drugs, and other goods are conveyed to Bolivia and to the cities of southern Peru—Arequipa, Juliaca, Puno, Cuzco.

**A Quarrel over a Rich Desert.** From Mollendo it is a short sail southward to Arica, the port of Tacna, in the northernmost province of Chile. Formerly Peru owned Tacna, but in the war of 1879-1883 between Chile and Peru the Peruvians were defeated, and since that time Chile has occupied it. The conquered territory was to



Courtesy of W. D. Boyce

FIG. 54. *Home in western Peru, where it almost never rains*

be returned to Peru after the lapse of some years on condition that a promised test vote by the inhabitants should show a majority of people in the region to be Peruvians. This has not been done. Chile has not kept her promise, and the result is constant friction between the two nations and every likelihood of another war.

A traveler once landed at Mollendo, climbed the steep slope to the customhouse, and there found his way blocked by an angry crowd gathered around a wild-eyed speaker, who now read from a newspaper, now shouted curses and imprecations to his listeners. The traveler found he was telling about the cruel treatment some Peruvians had received at Iquique, Chile. A mob had stoned their houses and so frightened them that they had taken the first steamer for Peru. Each time the speaker stopped for breath the crowd shouted, "Long live Peru!" and "Down with Chile!" The dock laborers caught the excitement, and when the next Chilean steamer came into port they refused to unload her cargo, with the result that she sailed away to Valparaiso with freight that had been dispatched to Mollendo.

The desert region that is the cause of all this trouble might seem, on account of its heat and aridity, to have no attraction for any nation, but a little study shows that it borders the great nitrate province of Tarapacá, once a part of Peru and a source of valuable nitrate of soda. As soon as the great beds of soda and borax were discovered each nation became eager to get the larger share of what was before thought to be waste land. Disputes over old treaties and badly marked boundaries arose, and finally a ruinous war was waged with the result that not only Tarapacá but also the bordering provinces of Tacna and Arica were lost by Peru.

Just outside the southern edge of the town of Arica is

El Morro, a five-hundred-foot hill bordered by steep cliffs, a landmark for passing vessels (Fig. 55). Here

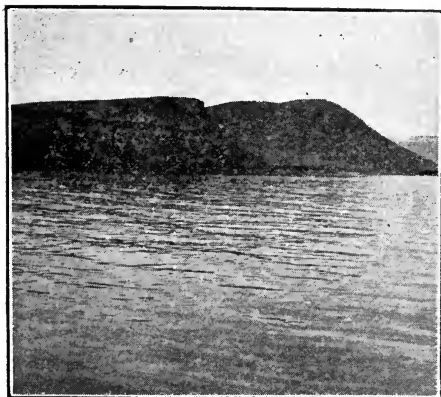


FIG. 55. *The famous hill near Arica, Chile, where was fought one of the great battles of the war of 1879. A Peruvian general is said to have spurred his horse over the cliff into the sea when he saw that the battle was lost*

was fought one of the battles of 1880, in which the Peruvians were defeated. When the commander of the Peruvian forces saw that the battle was lost, he spurred his horse over the edge of the precipice and thus leaped to his death rather than fall into the hands of the Chileans. El Morro is often

called the Peruvian Waterloo of the war of 1880. Upon its crest may still be seen signs of the fortifications once existing there, and one may pick up scraps of old muskets and guns and occasionally a rusty cartridge. Behind the hill are a number of graves bearing the names of those who fell fighting for the land and glory of Peru.

**The Steep Coast of Northern Chile.** A voyage along the arid coast of northern Chile is full of interesting sights of cities and people and natural scenery. From Arica southward the coast rapidly becomes bolder and soon presents to the sea a steep face from one to three thousand feet high. The same steepness also continues below sea level for many thousands of fathoms. For example, near the port of Taltal, Chile (Figs. 3

and 57) there is a descent of more than forty thousand feet in one hundred and seventy-five miles. This steep slope from lofty cliff to deep ocean abyss is characteristic of almost the entire west coast of South America. It enables steamers to sail very close inshore, and from their decks one sees many miles of bold desert coast. Here a sand drift extends out to the very brink of a cliff, its particles blowing into the sea; there a steep shore crumbles beneath the constant attack of the waves; and wherever a stream waters a narrow band of country, a few huts may be seen.

Soon, however, we come to ports and towns, Pisagua, Iquique (Fig. 60), Caleta Buena, Antofagasta (Fig. 62), Tocopilla (Fig. 56), and Taltal, which are not dependent upon fertile valleys or upon interior oases (Fig. 58). In fact, all signs of water are absent (Fig. 59). Here are

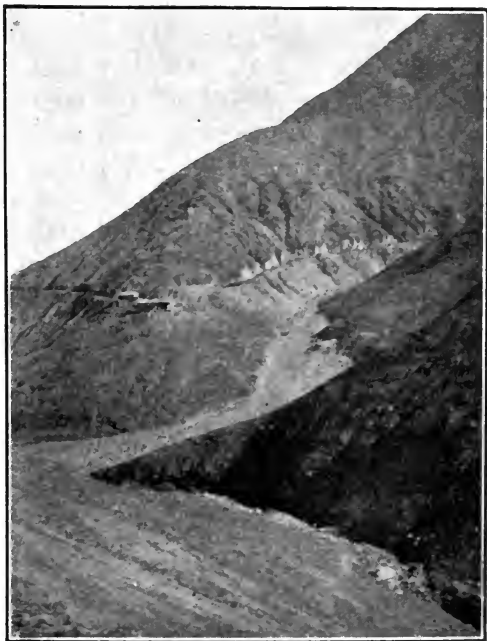


FIG. 56. *A mountain railway back of the port of Tocopilla, Chile. The grades are very steep and three engines are often required to haul even a short train of cars*

no fertile gardens, no line of verdant trees, no life-giving canals, no signs of agriculture or even of graz-

ing. Yet these are the busiest and largest ports of northern Chile. The cause of the peculiar conditions is found in the nitrate and borax deposits of the desert interior. In the beds of ancient and now vanished lakes are precious salts—nitrate and borax—that bring prosperity to an otherwise useless land (Fig. 57).

**The Caliche Beds of the Desert.** Nitrate and borax are not known to occur in such abundance anywhere else on the earth. The extremely dry climate of northern Chile preserves these minerals from destruction. If rain fell the salts would be quickly dissolved

and washed into the sea or covered with

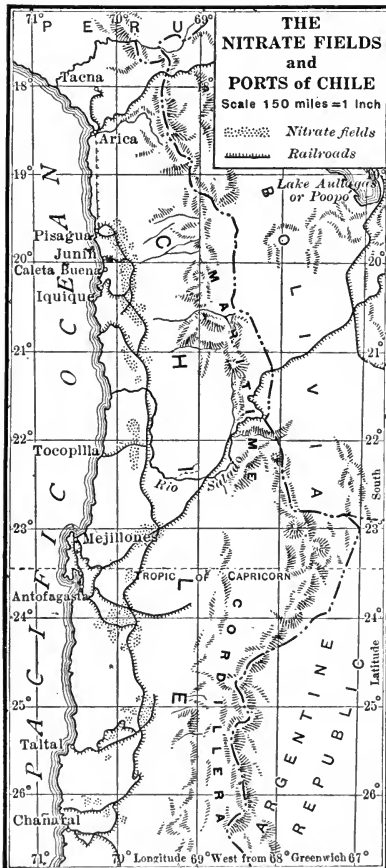


FIG. 57. A map showing the nitrate fields and ports of Chile

mud and other impurities and thus buried or destroyed. The extreme aridity which makes the land so barren is

seen to have a certain value here, for if people cannot grow vegetables and cotton, and raise cattle, they can at



FIG. 58. *Oasis of Soncor, western border of the Maritime Cordillera, Chile. Here a small mountain stream terminates near the edge of the desert of Atacama*

least produce soda and borax. The soda occurs in the form of great beds from a few feet to twenty feet thick, and in many places they are miles in extent. The "raw" nitrate of soda is called *caliche* by the natives. Fig. 59 represents one of these nitrate beds of northern Chile. The high temperature and the extreme aridity result in a cracked and very uneven surface such as one may see on the surface of a sun-dried mud-flat in July or August. During the day these warped and buckled salt-covered surfaces, called *salars*, are extremely hot and as trying to the eyes as snow. Animals as well as men suffer in crossing them by daylight, and night travel is therefore preferred. In one mile of travel upon a difficult salar a traveler once counted sixty shoes or fragments of shoes torn from the feet of passing mules. Beside the trail one may frequently see the bleached bones of some animal which has been overcome by heat

or thirst, and left to die in the desert. Nothing grows upon their parched surfaces; naked as bare rock, the salars are the dreaded spots of the desert.

**The Manufacture of Nitrate of Soda.** The process by which nitrate of soda is refined for commerce is as simple as it is interesting. The raw caliche is so hard and resistant that it must be first broken up with dynamite exploded in small holes bored from one and a half to fifteen feet deep. The explosion sends up a puff of smoke and great masses of caliche. The broken fragments are piled into two-wheeled mule carts, in which they are conveyed to small box-like railway cars with a dumping device that is easily operated by a lever. As each car comes abreast of the stone crusher it is dumped and the blocks of caliche go rattling down into a hopper that feeds the rollers. The crushed caliche is transferred



Courtesy of the Pan-American Union

FIG. 59. *Piles of raw nitrate or "caliche" ready for transportation to the nitrate works, northern Chile*



to vats, where it is boiled until the nitrate is dissolved. The water containing the dissolved nitrate is then drawn

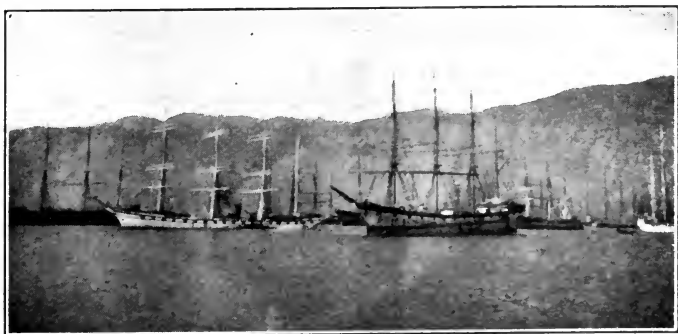


FIG. 60. *The harbor of Iquique, Chile, the greatest nitrate port in the world. To this port come ships from almost every large country. They are mostly sailing ships that make slow time, for the nitrate does not require quick delivery*

off into huge, shallow drying pans. In the heat and dry wind and under the clear skies of the desert the water quickly evaporates, leaving a dazzling white, crystalline substance, the commercial nitrate of soda. With the water evaporated a dense mother liquor remains from which iodine is manufactured.

After the drying out of the nitrate it is put into sacks, each weighing about two hundred pounds, and shipped by rail to the nearest port, whence waiting steamers convey it to distant countries. It is very much in demand in Europe as the basis of a fertilizer for worn-out gardens. It is also employed in the manufacture of gunpowder and many other kinds of chemical compounds.

So unusual a commodity as nitrate is rarely shipped out of a South American country that uses but little itself, without paying an export duty or tax, the burden of which falls upon the consumer in foreign lands. On

each hundredweight of nitrate the government collects a tax of about twenty-five cents, and since many millions of hundredweight are shipped out of the country each year, the total income to the government amounts to the handsome sum of about thirty million dollars. This is a large part of the total revenue of Chile and is equal to a tax of ten dollars upon every man, woman, and child in the republic. With this revenue Chile supports her fine army and navy, builds public roads and edifices, makes surveys and maps of the national territory, and pays the salaries of government officials. It relieves the people from a part of the expense of government but at the same time makes them careless about government money, which is often spent wastefully and even wrongly.

**People in a Desert without Food.** One of the most remarkable things about the nitrate establishments is their complete dependence upon the outside world for everything except nitrate; even the drinking water is obtained from distant sources. They are set in the midst of so arid a desert that everything required for their operation must be brought in by sea or over difficult trails from the Argentine or from Bolivia. This is true not only of the machinery, the coal, lumber, structural steel, iron, and glass, but also of the men, mules, hay, grain, vegetables, flour, and meat. Nowhere else except in the driest and most forbidding desert could such a substance as nitrate be found; nowhere else could be found so difficult a place for building and maintaining great establishments like the nitrate manufactories.

The nitrate *oficina* at Central Lagunas, southeast of Iquique, Chile, derives its fresh water from a pumping station at Pique, eighteen miles away. It secures a part of its vegetables from Pica, over fifty miles away. The officials are chiefly from England. The horses and

mules, and the hay and grain they consume, are brought by steamer from southern Chile. The machinery, canned fruit, and tinned meat are principally from England and the United States. The workmen are from southern Chile and Peru. Lumber is brought in schooners from Oregon, Washington, and Australia.

The number of men employed at a given establishment is from three or four hundred to a thousand. They live in houses arranged in regular order about a central plaza or a long street of bare sand. The houses are commonly made of corrugated sheet iron and many are without floors or windows. This is, in a way, an advantage on account of the great heat, but it does not always induce the owners to be as clean as they ought to be. Their village life is rather dull; a few games, among which are football and cricket, are sometimes played, but usually the great heat and the complete absence of streams, grass, and cool forest or park, forbid all but the necessary exertions.

**The Great Nitrate Ports.** The great nitrate exporting ports, Iquique, Pisagua, and Antofagasta (Fig. 62), and a half dozen lesser ports as well, have a far more interesting social and business life than have the nitrate villages. Iquique, for example, has a population of fifty thousand, maintains three beautiful plazas, has several good clubs frequented by Englishmen and Americans, and has stores and shops where one may buy practically everything that can be bought in the ordinary stores of this country. Its water front presents a very busy scene (Figs. 60 and 61), for Iquique is the greatest nitrate port in the world. The flags of many nations are represented by the twenty to thirty boats one may always see riding at anchor in the outer harbor. The ships are of every variety—three- to five-masted schooners, steamers of

every size, a few full-rigged ships, and smaller craft, in considerable numbers. The inner harbor is full of



FIG. 61. *The fleet of ships from many countries at the port of Iquique, Chile, loading nitrate of soda*

rowboats owned by men who meet the large steamers for passengers and baggage and assist travelers from hotel or steamer. As in all the other coast ports of South America, they crowd about the incoming steamers in great numbers, jostling each other and shouting and gesticulating in the most violent manner. When they have secured a passenger they hurry up the gangway,

leaving their less fortunate companions to continue the crowding and the shouting. The scene is a novel one to the stranger, who, if he does not understand the language, is rather bewildered than assisted by the many loud offers of the willing boatmen. At most ports the number of boats is increased by fruit venders, who bring out vegetables and fruits of many kinds for the passengers.

Iquique is like the interior nitrate villages in being almost wholly without means for securing food except by boat and to a very trifling extent by rail. Vegetables are brought in from Pica, forty miles away, and water from Matilla through a pipe line thirty-five miles long. Everything else must be shipped from outside ports. Until the pipe line to Matilla was completed even the drinking water had to be brought in by sea and peddled in carts from door to door. Now it is provided by the city, to the great comfort and relief of all, especially the poorer people.

So completely is the city of Iquique shut in by the desert, and so dependent is it upon the outside world for supplies, that in time of war it is easily conquered by sea. The enemy has only to control the sea to control the food supply, and by shutting off this supply bring the people to terms. Furthermore, there are no natural means of defense for any of these cities; their shore fronts are exposed, and there is no fertile back country from which men and supplies may be drawn. In 1880 in the war between Chile and Peru, and again in 1890 during the revolution in Chile, the city was taken by sea with scarcely any trouble whatever. So well aware is Peru that the sea is the great highway of movement against her old enemy, Chile, that her statesmen frequently remark that for every cruiser Chile builds Peru should build two.

A war between these two nations will always be largely if not wholly decided by a navy.

**Railways that Run up Steep Bluffs.** There are many peculiar difficulties which the towns of this steep coast must meet on account of their position at the foot of a bluff several thousand feet high. At Caleta Buena four railways make a three-thousand-foot descent to the shore (Fig. 3). Cables are attached to the cars and engines pull them up or lower them at will. The situation seems a dangerous one for a railway, but it is doubtful if more accidents happen here than on ordinary lines. The machinery is all of very good workmanship and careful watch is kept of every part. The system is not unlike that used for making the ascent of Mt. Tom, Massachusetts, or Pikes Peak in Colorado. Nevertheless, one feels a certain aversion to a trip on such a railway and few passengers enjoy what seems to be so perilous a ride.

At Pisagua and Antofagasta (Fig. 62), as well as at Tocopilla, the descent to the shore is made in ravines, that have been cut deep in the bluff, and the railway winds in and out in the most tortuous and irregular manner. For miles there is scarcely more than a few hundred yards of straight track in a single stretch. The grade is so steep it requires several hours to make the ascent with two engines and a short train.

**Earthquakes.** The picturesque town of Pisagua, Chile, is typical of the peculiar position of all these coast towns on a narrow terrace at the foot of a cliff. The terraces are due to the planing action of the sea when the land stood somewhat lower than at present. After uplift occurred the formerly submerged shelf became a terrace. Such an uplift may mean the slipping of two blocks of the earth's crust in such a way as to cause a

shock or jar which makes the ground tremble. The total amount of the slipping or faulting that has taken place on the west coast of South America is very great and is in part the cause of the remarkably steep coast. The earthquakes that occur as a consequence of such slipping of blocks of the earth's crust are very frequent indeed. No one has counted them all, but it is safe to say that scarcely a week passes without a jar heavy enough to be felt. Fortunately few of them are dangerous.

At irregular intervals a violent earthquake visits the

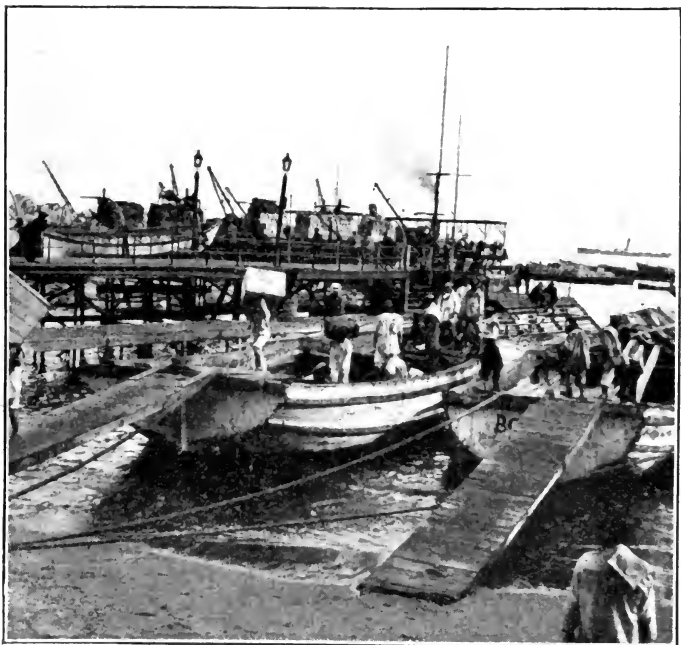


FIG. 62. *Unloading merchandise at Antofagasta, Chile. As there are no good natural harbors along this shore, the ocean steamers anchor some distance from the coast and unload their cargos into small boats called lighters that are rowed to the short wharves*

region, sometimes with terrible effects. The solid earth seems to have become even more restless than the sea. To the rumble of the quake is added the crash of falling buildings and the screams of the terrified people. Fire may break out and add to the horror of the calamity and an earthquake wave may come in from the sea, sweep over the low exposed terrace on which a city stands, and complete the work of destruction.

In a moment a city may thus be partly destroyed, as was Valparaíso in 1907, Iquique in 1860, and Arica in 1877. In the ruined zone the charred and blackened façades of the buildings faintly outline the cluttered streets. Disorder prevails among the terrified people; the food supply is destroyed, and there is want and misery. Only after the lapse of months can the business of the city proceed as usual. Small wonder that after these dismal effects are once witnessed the slightest rumble startles the inhabitants and a heavy jar drives many of the people into the streets and fields with prayers and lamentations, fearful lest the walls of their houses fall and bury them beneath the ruins.

**Some Oases of Tarapacá.** An excellent view of one of the larger oases of the desert of Tarapacá (Matilla) is shown in Fig. 63. A smaller one, east of Iquique, is called the oasis of *Monte la Solidar*, or "Mount of Solitude." It well deserves the name. A single family of three have their home here, and secure a living from a small flock of goats, a few vegetables, beans from an algarrobo tree, and water from a well near by. They also own a few mules, some sheep, and a dog. The house is made of bark and twigs and a few pieces of lumber. It is twenty-five miles from their rough home to the nearest neighbors. A more isolated spot could hardly be found.



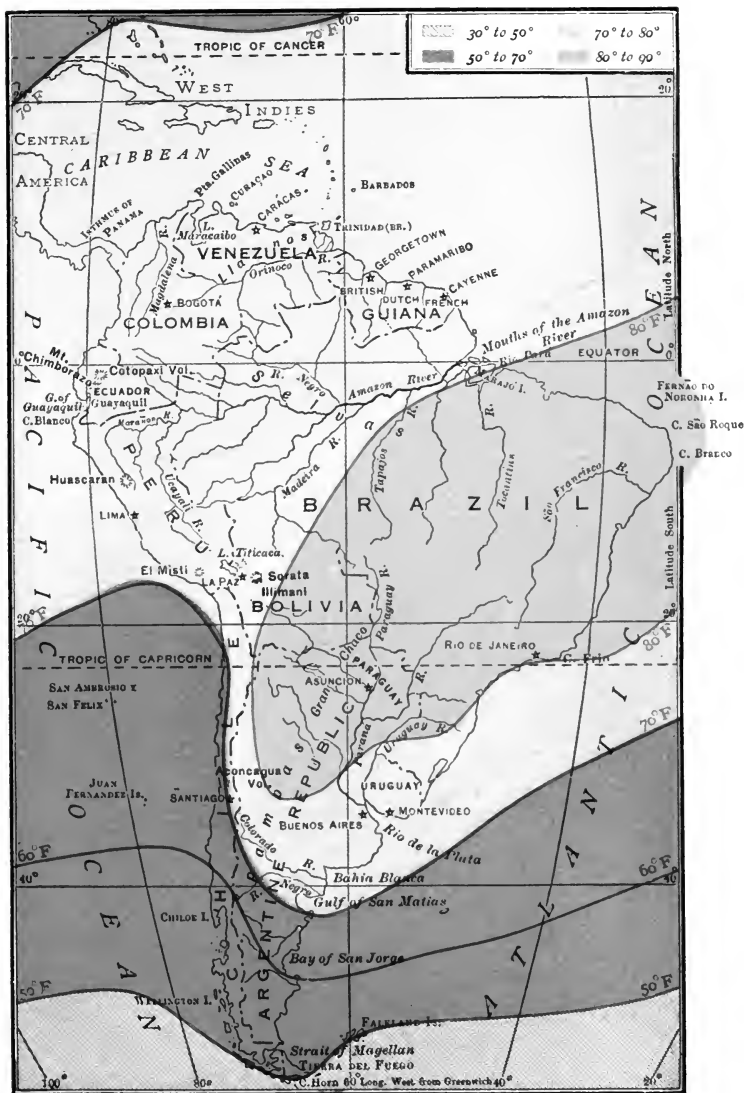


PLATE V. Mean January temperature

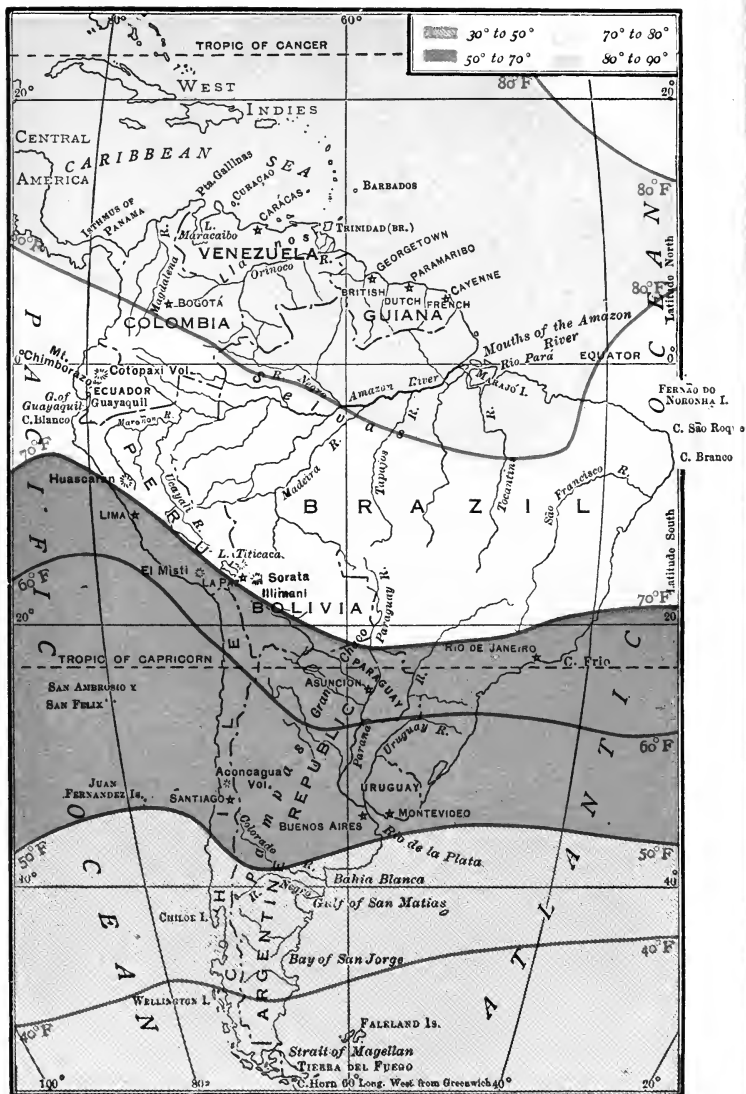


PLATE VI. Mean July temperature

Since the life of each oasis depends upon a water supply, every inhabitant is concerned about the storage and use of water. If the village dam breaks or high floods sweep down the valley and overwhelm the ditches and gardens, the condition of the people becomes very sad. Supplies must come over long and difficult trails. The poor cannot buy what they have no money to pay for. Small wonder that water and streams are objects of reverence to the Indian dweller of the oasis. Although he has been taught the forms of a new religion (Catholic), he thinks of the old meanings, and the getting of food is still his chief object in life. His prayers are pathetically simple: he asks for full rivers and bountiful harvests that his daily bread may not fail.

In some of the oases the ordinary water supply is not sufficient for the needs of the farmers. Deep holes or pits are then dug, on whose floors vegetables and grains are grown, which are not only shaded most of the day but also reach the ground water and thus use moisture that would otherwise go to waste. One may even see *trees* growing in the bottoms of the larger pits. The digging of these great holes requires a vast amount of hard labor, but the desert farmer must have water, and if it will not come to him he must go to it. This is a common practice in deserts. In Egypt and Algeria it is well known and has been followed for centuries. It represents an interesting phase of man's efforts to make "the desert . . . rejoice and blossom like the rose."

Each town has its patron saint, supposed to guard some special interest of the place. For instance, Saint Andrew is the patron saint of Pica, where excellent wine is produced. San Isidro is the patron saint of the farmers at Canchones. Sometimes the patron saint of one village is taken to visit that of another village to ask alms. Then

the wax figure of the visiting saint is carried at the head of a procession which marches across the desert to the next village, where it is met and welcomed. The united

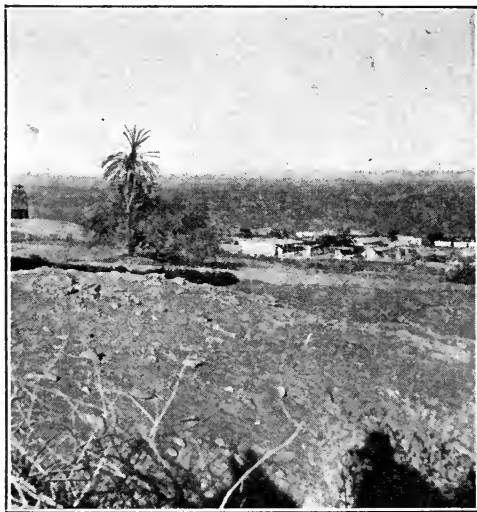


FIG. 63. *The prosperous oasis of Matilla, desert of Tarapacá, Chile. The white band in the background to the right is the desert trail. The tower light at the left is for the traveler who crosses the desert at night*

processions, marching to the sound of fife and drum, enter the church and close the rites with solemn prayers and chants.

From the desert the appearance of an oasis town after the heat and fatigue of a long, dusty ride is distinctly inviting. The neat squares of the vegetable

gardens, the rows of refreshing orchard trees bordering the canals, the life-giving stream, and the clustering houses of the villages combine to make an unusual picture.

Upon some hilltop near each desert town a light is usually kept burning. Without it the traveler would find night travel difficult, since so many of the trails are half buried by drifting sand. The oasis of Matilla, a cluster of houses and palm trees, is shown in Fig. 63 with its tower light on the extreme left. The white band in the middle distance is a trail fifteen miles

away. In the extreme background are the coast ranges.

**Where the People Pray for Rain.** The southern end of the west-coast desert is visited by an occasional rain-storm in the winter or spring. Like the desert of southern California, its rainfall depends entirely upon the season, no rain falling during the summer and only a few showers during the spring. These showers increase in number southward, until finally, within the belt of the westerly winds, rains occur every two or three days and a certain amount of vegetation is found. The people eagerly watch for showers and in the springtime ask every desert traveler from the south if he has heard of rain. If he reports that rain has fallen in some valley near the southern end of the desert the people farther north are hopeful. They, too, may be lucky enough to have a shower.

Besides the inconstant rains, which cannot be depended upon for a regular water supply, the inhabitants make use of the streams fed by rains and melting snows in the mountains. The extent of the winter snowfall in the mountains determines the amount of water the people will have for irrigation during the following summer (Fig. 58). Hence they watch the mountain snow with great interest. If it comes far down the mountain sides and whitens them below the usual level there is the greatest rejoicing, for the abundant snows of winter mean rich harvests in summer. If the snows are light the people are discouraged. There will be little water for irrigation, the gardens and fields will suffer, and many of the people pray for rain. But when the snows are too heavy, or melt too rapidly, great floods come down the mountain gorges. These spread out over the fields an infertile deposit of coarse gravel and tear up dams and ditches. Sometimes the damage from flood is as great as that from drought.

## CHAPTER VII

### THE HIGHLAND DWELLERS OF BOLIVIA AND PERU

**The Switzerland of South America.** The Indians of the lofty table-land of Bolivia live on farms far higher than those of any other large group of people in the world. For this reason Bolivia is sometimes called the "Switzerland of South America," but it would be more nearly correct to call Switzerland the Bolivia of Europe, for the elevations at which people live in Switzerland are far below those of Bolivia. Among the Alps the farms are in few cases above six thousand feet; in Bolivia almost all of them are above that height, and most of them are between seven and twelve thousand feet. Indeed, one finds many farms at elevations well above thirteen thousand feet, while the stone huts of mountain shepherds have been found at seventeen thousand one hundred feet, or just below the snow line, the highest habitations in the world.

These facts are well shown in the two maps, Fig. 64 and Fig. 65; Fig. 64 represents the elevations of Bolivia. It shows that the southwestern third of the country contains all the high land while the northeastern two thirds are almost wholly tropical plains. Now in most countries the greater part of the people live on flat, fertile plains; they avoid the mountains. But in Bolivia there are almost no people on the plains, and in some places there is a dense population in the mountains. This is because the climate of the highlands is cool and that of the plains is hot, and, further, because the mineral wealth of the country is in the highlands (Fig. 66). If people wish silver, copper, and tin, they must go up into the mountains for them and to places at such great elevations that life is decidedly uncomfortable because of the cold and the

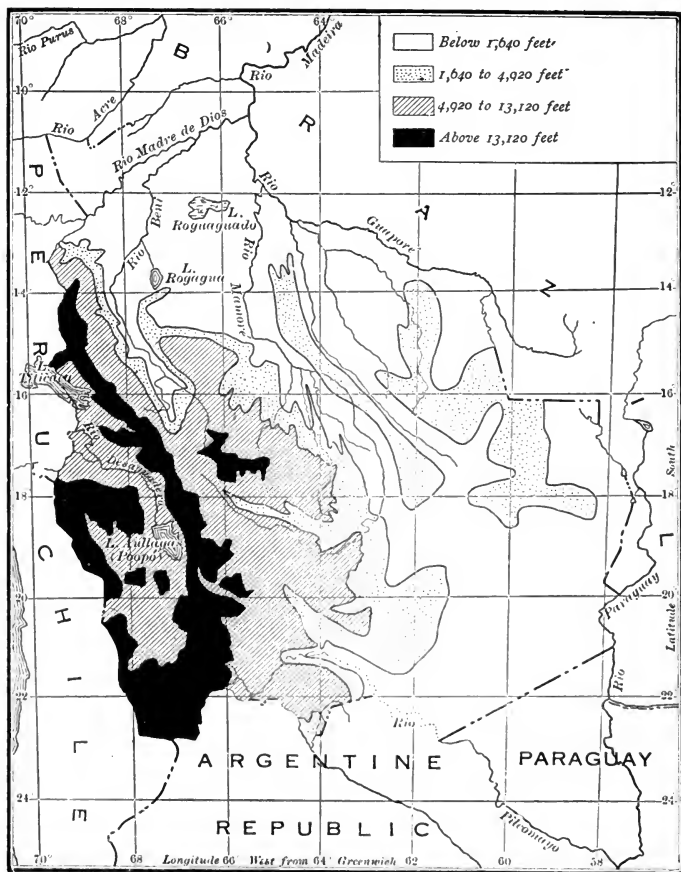


FIG. 64. A relief map of Bolivia

mountain sickness. Thus the province of Frias, in the department of Potosí, has nearly forty people to each square mile, although the elevation of the principal city, Potosí (Fig. 67), is more than thirteen thousand feet, decidedly too great for comfortable living.

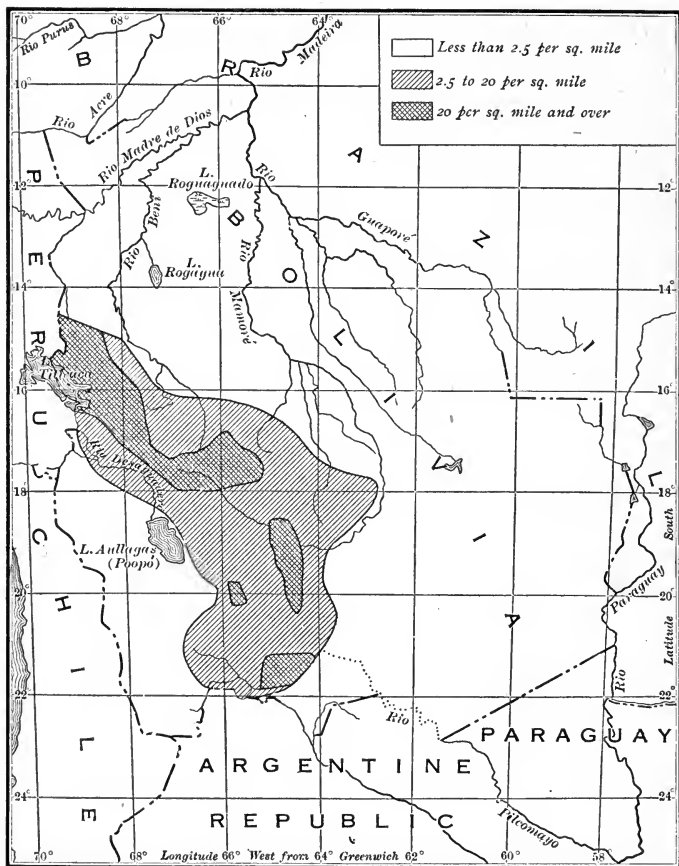
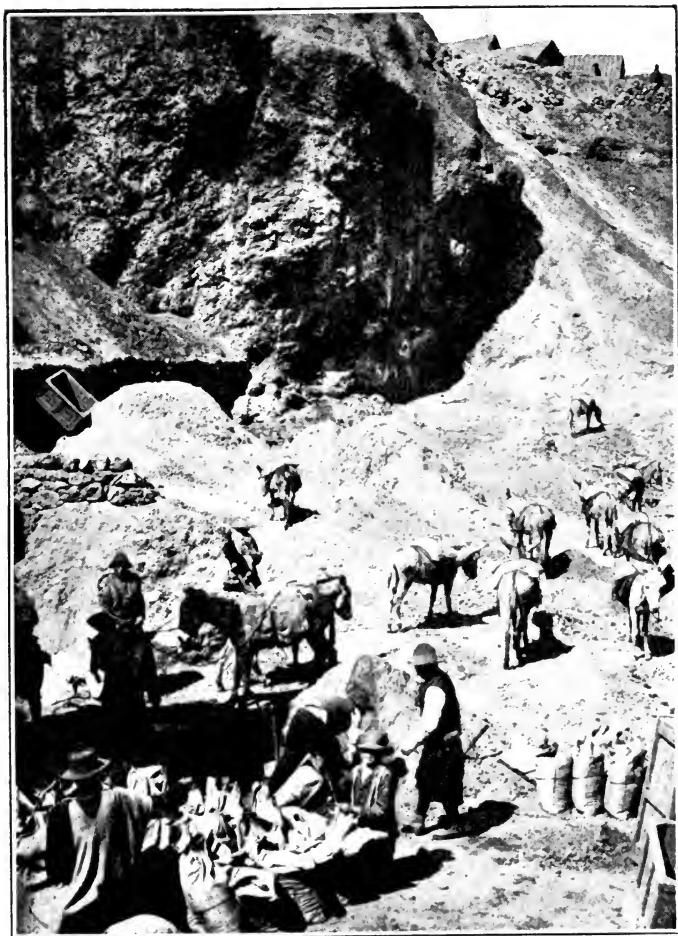


FIG. 65. A map showing the density of population in Bolivia

In the Nevados de Araca southeast of La Paz are mines nearly seventeen thousand feet above sea level where the cold is intense, the ground often covered with snow, and where a frost occurs nearly every night. The strongest engineers cannot work long at this great elevation, and





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FIG. 66. *A silver mine that enriched the Spanish centuries ago, Cerro de Pasco, Peru*

after a few months they are obliged to go to lower places and rest. The workmen are Indians who are accustomed

to live at elevations from ten thousand to fifteen thousand feet, yet even they suffer from the effects of the rarefied



FIG. 67. *Potosí, Bolivia, one of the loftiest large towns in the world*

air, and it is often with difficulty that enough laborers can be secured to operate the highest mines. The Indians lessen the disagreeable sensations of mountain sickness by the incessant use of the coca leaf, from which cocaine is manufactured. The leaf is chewed, after being mixed with ashes, and the effect is to enable the Indian to get along for a time with less food, to endure mountain sickness or to avoid it, and to so numb his senses that he does not feel the cold.

**The Lofty Cities of Bolivia.** The mines, the climate, and the trade routes combine to hold the population of Bolivia to the highlands. The extent to which this highland population has grown as compared with that of the plains may be seen from the map (Fig. 65). Within the

cross-lined area there is a population density of twenty or more to the square mile. This cross-lined area may be seen, by reference to Fig. 64, to lie entirely in the highlands. The blank white area of the eastern plains has a population density less than one to the square mile. These facts may be stated in a slightly different way by saying that eighty per cent of the people (highland dwellers) live upon fifteen per cent of the area and twenty per cent of the people (lowland dwellers) live upon eighty-five per cent of the area. One may also gain a clear idea of the great heights at which the people of Bolivia dwell by noting that among the one hundred and fifty-one important cities and towns four are above 14,000 feet elevation, twenty-six above 13,000 feet, seventy-three above 12,000 feet, and seventy-seven, or more than half, are above 11,000 feet. The highest town of all is Aullagas, which is at the incredibly lofty elevation of 15,700 feet above the sea.

**The Irrigated Gardens.** The highland dweller of Bolivia who depends upon the soil for a living must learn the art of using water like his brother on the arid west coast in the desert of Atacama, for large parts of the table-land of Bolivia, while not so dry as the coast desert, are dry enough to require irrigation. From hundreds of mountain brooks and rivers the people turn water out over their fields and in many places transform the land into gardens.

About Cochabamba and in the fertile Cliza valley near by there are miles upon miles of green fields and gardens which stand out in sharp contrast to the brown and yellow desert about them. The same features may be seen along the edge of the plateau south of Oruro. Every mountain and plateau stream has been carefully directed out upon the fields of rich alluvium that border

the edge of the plateau. Here one may see within short distances of each other all the kinds of life found in the country. In the background of the photograph (Fig. 68) may be seen the desert mountains with rich tin and silver mines; at the foot of the mountains are the valleys, and upon their sides are the irrigated farms of the people who till the soil for a living, while out beyond the reach of the life-giving streams is the desert, where may be found only a few dry plants and the scattered huts of the shepherds with their flocks of llamas and sheep (Figs. 71 and 76).

**The Terraced Alluvial Fans of the Plateau.** The care

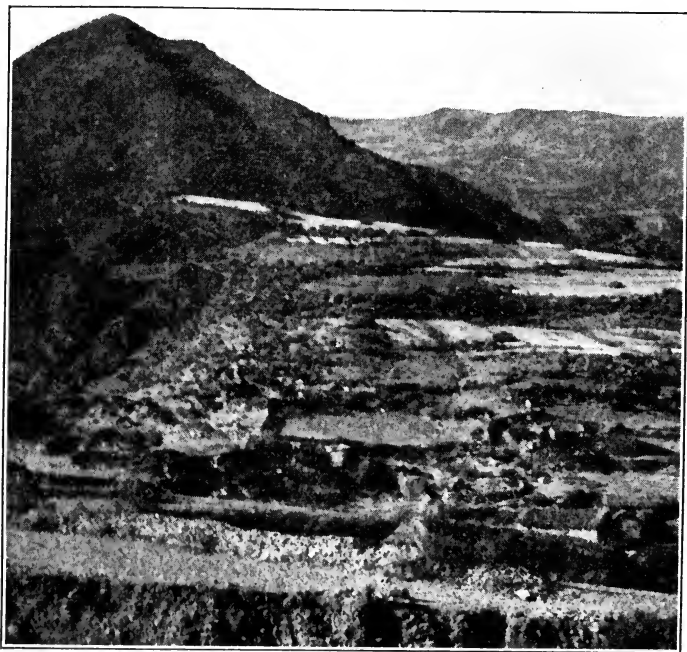


FIG. 68. *A terraced alluvial fan in the great Bolivian plateau, near Cochabamba. Note the thick walls and the thatched roofs of the houses*

and industry of the highland farmer are well shown in the terraced fields that one may see in many parts of this



FIG. 69. *Looking across the terraced slopes at Huaynacotas in the Cotahuasi valley*

roof of the western world. The terraces are well shown in Fig. 69, which shows hillsides near Cotahuasi, Peru. Similar terraces may be seen in hundreds if not thousands of places throughout highland Bolivia and Peru. They may always be found where water and good soil are found together but where the slope is so steep that the water would furrow it and cut the fields to pieces if terraces with flat tops were not made.

The running water of the irrigation ditches is not always used merely for the crops. If there is enough for the fields and to spare, a mill is built, and the water turns a wheel for grinding the barley, corn, and wheat. If

there is plenty of good soil in one place and not much water, more terraces may be built than can be supplied with water. It may happen in this case that near by is a stream running to waste because there is no land that can be tilled. Then the clever farmer constructs a long irrigation ditch which turns this way and that along the valley; in some places the stream that flows through it furnishes power to a mill wheel, or slips through a tunnel cut in solid rock, or runs smoothly over a viaduct supported by a stone arch. The labor required to build all these works is great, but water in the desert is also very valuable. The deep, rich soil and the hot sun produce abundant crops if only enough water is supplied, and the desert farmer who terraces his fields and brings his water over long and difficult routes is always richly repaid for his work.

**A Plateau without Trees.** The farmers of Bolivia in general live together in small villages and go out from them to till their farms and gardens, though one may see many an isolated hut far from any village. The appearance of one of these villages is well shown in Fig. 70, a photograph taken in western Bolivia—a cluster of the most curious houses, with walls of hardened mud, floors of earth, and benches of stone. But little wood is used in the houses or even for furniture because it is very scarce on the arid plateau and must be brought over such long distances and at such great expense that poor people can afford only the smallest amounts. Even an ordinary ox whip with a plain wooden handle costs more than the well-braided lash of cowhide, cattle being numerous on parts of the plateau but wood a luxury. In the forested Juntas valley of eastern Bolivia (Fig. 123) one may see Indians bringing cedar planks on their backs to Cochabamba, more than a week's journey on foot over a steep and difficult trail. The cedar is brought in for making

tables, chairs, and benches for the townspeople. In some of the houses one sees many curious things used

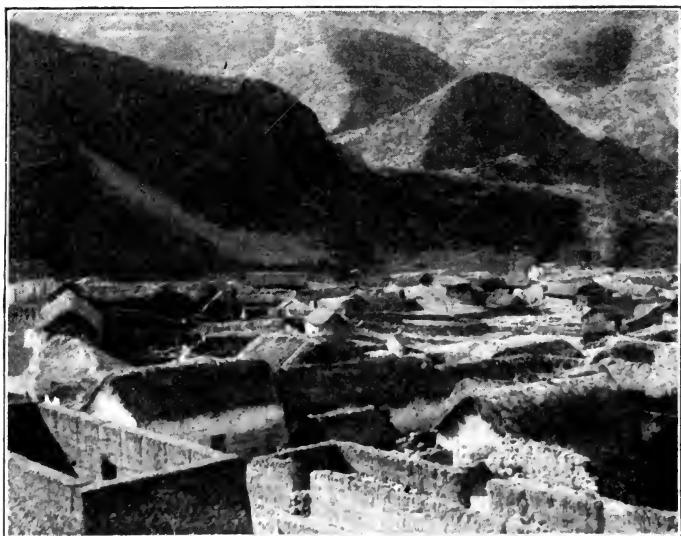


FIG. 70. *A mountain village in the eastern Andes of Bolivia*

in place of wood. Reeds, bamboo, cornstalks, and even sugar cane are sometimes built into the roofs and walls. In some places a giant cactus is cut down and its hard interior split into a kind of wood used in place of boards for the door frames and thresholds of the houses.

On the roof of the highland dweller's hut there is commonly a thick covering of grass or straw. The thickness of the roof covering is less to keep out the rain than the cold, for the rains are few in number and rarely heavy, while everywhere the night temperature is keen and the winter cold intense, especially in the higher villages. To keep out the cold the houses of the plateau villagers of Bolivia are commonly without windows. The

door is the only way by which light may enter, and the interiors are generally gloomy and dirty. When

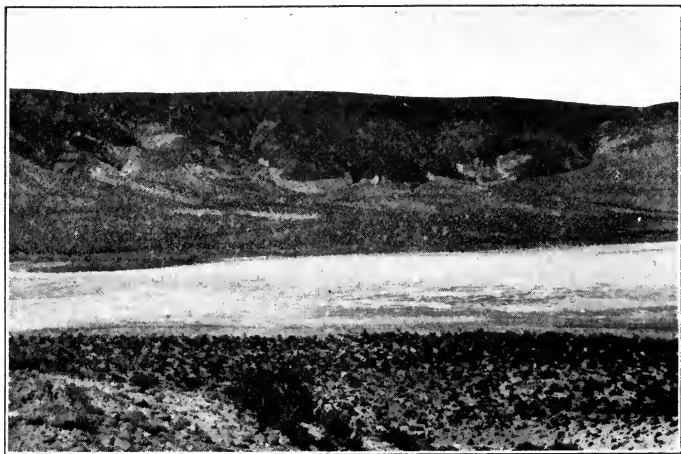


FIG. 71. *A scene in western Bolivia. The white band is a plain of salt. About it are hill slopes covered with a thin sprinkling of grass and bushes. The place is about 13,000 feet above the sea*

cooking is done the smoke is allowed to escape as best it can through the open door. As a result the walls and roof are blackened and the whole interior filled with smoke. Even fowls are sometimes kept in the houses and roost in the sleeping rooms of their owners.

When a plateau Indian wishes to build a house he stirs up mud and water as if he were about to make a huge mud pie. Then he adds straw or grass, tramping the whole with his bare feet until it is thoroughly mixed. The wind and the sun are then allowed to dry the mud, which is first put into molds. The great blocks of dried mud are used like stone or brick in building the walls of a house.

The plateau has little wood. So when an Indian needs rafters for the roof or frames for the door of his



house, he goes in search of cactus like the *cordon* of Fig. 72. From a dead trunk he strips off the spiny outer layer and exposes a thick, porous, and hollow inner layer which is easily split into any desired shape. If cacti cannot be found, he must carry wood for long distances from the eastern forests.

**The Highland Shepherd.** Ranged on all sides of the plateau villages are the corrals in which are kept at night the flocks of llamas, alpacas, and sheep that graze upon the mountain pastures. Their owners drive them out during the day and travel all over the higher mountain valleys in search of food. In the most bleak and lofty situations isolated corrals are built for those shepherds who take their flocks out for days at a time or for the caravans of llamas that engage in trade from place to place, carrying flour, wood, millet, barley, salt, and wool. As the shepherd drives his sheep or llamas along he clucks and whistles and with a sling of twisted wool throws stones at them to keep them going in the right direction. While wandering with



FIG. 72. Tree cactus from which wood is obtained by the mountain Indians

his flock he generally carries a bunch of wool on his arm or at his waist, and spends his spare time industriously spinning the wool into yarn for the thick blankets, cap, stockings, and coat that he must wear to keep out the cold (Fig. 77). It is a lonely life that the shepherd leads, often without shelter except the corner of some corral, without good food for days, and far from any village. But his flock is to him a great necessity. Without it he would have neither meat nor clothing for his family (Fig. 76).

**The Camel of the Plateau.** The llama, the almost universal beast of burden among the plateau Indians, is a peculiar animal. It is half camel, half sheep, in its general appearance. Its short body, cloven hoof, and stubby tail are very like those of the sheep, but it has long legs, a long neck, and a head like that of the camel. It is especially like the camel in its patient ways, stupid stare, and ludicrous face. When one rides through a flock of llamas some become curious and walk up and stare into one's face in a very funny way. If an attempt is made to drive them off they spit in a half scornful manner, and with a very dignified air walk solemnly away. Many llamas that are driven in caravans are scrawny and mean looking, but those that are kept for their wool and meat and pastured in the watered oases have much beauty of color and grace of carriage. In the shops of the large towns are small models of llamas made of silver wire, and a llama is figured on the Bolivian coat of arms and stamped on the silver coins (Fig. 73).

Food is rarely carried for the llama even across the desert wastes. The poor animal must hunt its own food, and this while it is carrying a burden and traveling over a hard trail. But its owner drives it along very slowly, usually not more than fifteen miles a day, and thus allows

it to wander from bush to bush and pick a living on the way. Neither is it loaded with too great a burden. Although it will carry seventy-five pounds day after day if it can secure a good supply of food, it is seldom obliged to carry more than fifty pounds. The llama is an awkward animal to control, for it is always getting off the trail, and will not heed an ordinary call, though it answers to the whistle of the Indian driver.

Fig. 74 shows a caravan of llamas just starting from a railway with flour that has been shipped from Oregon by steamer and several hundred miles across the desert of Atacama, the western Andes, and the great central plateau of Bolivia. Now it is starting from Challapata on a caravan trip across the eastern Andes to the mountain basin in which lies Sucre, one of the four largest cities in the country.



FIG. 73. *A Bolivian ten-cent piece*

**Moving a Piano on Muleback.** Think of the expense of securing supplies for a great city in this roundabout way! The country is without manufactures and must buy its cloth, shoes, machinery, and even its pianos from either Europe or the United States. Think of moving a piano to Sucre! Yet this is done. The great box in which it is carried is fastened to four mules, two in front and two behind, and away goes the procession of drivers and beasts—sometimes across lofty mountains—with a piano that has already journeyed from four to twelve thousand miles by sea and land. Every night the mules are relieved of their load; every morning it is strapped to their backs again. In this laborious way it is at last delivered at an expense which only the wealthiest can afford. A piano in Sucre costs more than twice as much as a piano in the United States.

**The Wild Vicuña and Guanaco.** Closely related to the llamas are the alpacas, the vicuñas, and the guanacos of the plateau region of Bolivia and Peru. The alpaca is a domesticated animal and is found chiefly in southern and central Peru and western Bolivia. In general appearance it resembles the llama, though it has shorter legs and both legs and body are covered with wool. It is never used as a beast of burden but is kept in flocks that spend their time in grazing. Its flesh is used for food, but its chief service to its Indian owner is its fleece, which, if pure white, is especially valuable for both rugs and clothing. Alpaca wool is very fine and thick, and is highly prized.

The Indians hunt the wild vicuña and guanaco with dogs and powerful rifles, for one cannot get near these fleet



FIG. 74. *Llama caravan at Challapata, Bolivia, about to start with a load of Oregon flour for Sucre, over a week's journey to the east*

beasts without a favorable wind and under cover of a screen of brush. The hunters sometimes stalk the vicuña, a method that requires great skill and craftiness, for it is one of the wariest game animals known. At the slightest sound it scents the air and with keen eyes searches every spot for an enemy. At the first sign of danger it is up and away at great speed to escape in some deep ravine or on the summit of a lofty ridge. In Bolivia these animals live in the loftiest valleys among the mountains during the summer, but in winter they come down to the lower pastures that are free from snow.

### **A Declining Tribe of Fishermen.**

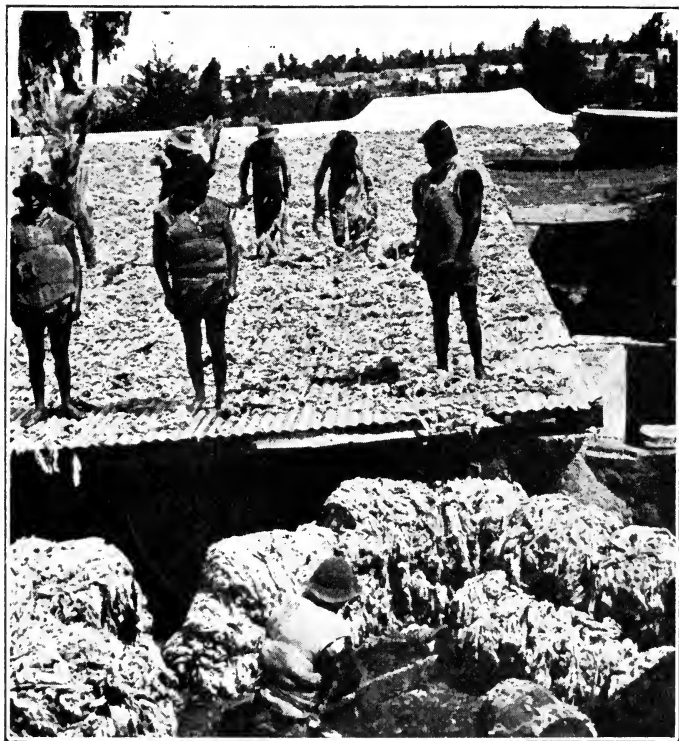
Besides the vicuña, guanaco, a species of deer, and the vizcacha, a small rodent, there are few game animals in all this great plateau region. In fact, they are so few that the Indians as a whole have apparently never lived in the purely hunting stage. They are farmers who depend chiefly upon the soil and not upon the chase for a living. In the whole region there is but one hunting and fishing tribe.



Courtesy of W. D. Boyce

FIG. 75. *Moving day in La Paz, Bolivia*

Fig. 78 shows a fisherman on Lake Titicaca, a member of the tribe called Uros, now much smaller in numbers than formerly. They live mostly in the reed swamps of the Desaguadero River, the outlet of Lake Titicaca, and fish on floating rafts of reeds and brush. They also tend flocks and cultivate small farms on the shores of the lake and thus earn their living in several ways. Their boats are made of straw and are fitted with light



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FIG. 76. *Washing and drying wool from the Andean table-lands for foreign trade, Arequipa, Peru*

bamboo masts and straw sails. Since the straw becomes water-soaked after a time, the boat must every once



FIG. 77. *Blanket weaving among plateau Indians*

in a while be drawn up on the land and dried out.

**The Steamers of Lake Titicaca.** Lake Titicaca, on which many of these curious craft are found, has the distinction of being the loftiest large lake in the world. Its surface is nearly two and a half miles above the level of the sea. It is one hundred and forty miles from end to end and about sixty miles wide. Although the water is not salty it is of rather poor quality. Lake Titicaca discharges through the Desaguadero ("the Outlet") River, which in turn empties into Lake Poopó, a very bitter salt lake one hundred and fifty miles to the south. In spite of its great height above the sea, Lake Titicaca is one of the valuable lakes of the world. At its western end is the port of Puno (Fig. 79); at its eastern end is Guaqui. These are the two lake terminals for the railway from the seacoast to La Paz, the capital of Bolivia, and between them ply a line of steamers. The boats were made in Scotland at one of the great shipbuilding

yards of Glasgow and shipped to Lake Titicaca in pieces. After a long ocean voyage and a journey by rail from the coast, the pieces were put together at Puno to make a steamer.

Nearly all the supplies of northern Bolivia are now brought over Lake Titicaca to La Paz. The material for the new railway between La Paz and Oruro was also brought over the lake. We may therefore say that a railway was carried across Lake Titicaca by steamer. The ties and telegraph poles were brought from Oregon and Washington, the steel rails were shipped from Pittsburgh, and the engines were manufactured in Philadelphia.

**The White Salt Plains.** South of Lakes Titicaca and Poopó are the great salt plains of the high plateau of Bolivia. Into them drain streams from a large area, the great interior basin of the central Andes. During the wet



FIG. 78. Uros Indian making a reed canoe on the border of the great reed swamp of the Desaguadero, twelve miles south of Lake Titicaca. The rope with which he is binding the reed bundle is made of grass. Note the cattle far out in the swamp in the background



season they are partially covered with water and are then all but impassable. In the dry season they may be



FIG. 79. *Port of Puno, western end of Lake Titicaca. It was here that the first steamer on the lake was built after being carried in pieces on the backs of mules and burros over the western Andes*

crossed by any one of a dozen different trails. Their white dazzling surfaces stretch out for scores of miles as a perfectly smooth plain, reflecting the sunlight from thousands of salt crystals. Standing upon the western margin of the plain at sunrise and looking across it toward the east one gains a most impressive and beautiful view. From the plain a certain amount of salt is obtained that is shipped in small cakes to many parts of Bolivia; but its wide expanses are difficult to cross and its great wastes furnish neither pasture nor wood for man's use.

The traveler across these salt plains about the borders of the lakes must pick his way with considerable care. In many places the surface consists merely of a crust of salt below which lies water; or the alluvium about the borders

(Fig. 80) is honeycombed by the vizcacha, an animal somewhat like the prairie dog in its general habits. Upon these treacherous surfaces the mules and horses often find it extremely difficult to make headway without stumbling and throwing their riders to the ground. In the full glare of noonday the white surfaces are very trying to the eyes, and the many whirlwinds that sweep across the plains raise aloft great columns of dust, often to a height of hundreds of feet.

**The Shy Mountain Folk of Western Bolivia.** The people upon the western border of the great salt plains of Bolivia are shut off from easy communication with the rest of the country. If they wish to reach the desert oases on the west they must cross the western Andes; if they wish to reach the people on the east they must cross

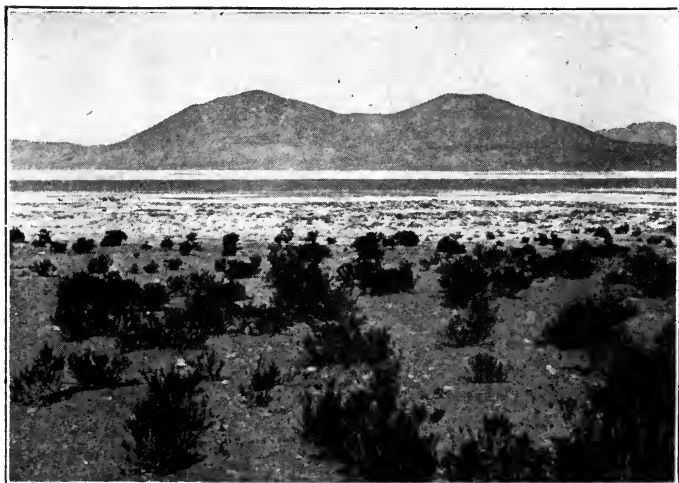


FIG. 80. The basin of Lake Huasco, Maritime Andes, on the boundary between Chile and Bolivia. The dark band in the distance is the lake, and the white areas around it are the salt beds that are formed as the lake gradually dries up

the salt plains, which are without water or food for man or beast. Until a few years ago white men had never been seen in some of their villages. When the first caravan arrived the people were afraid, and ran and hid themselves. Late in the afternoon when they returned they hid behind bushes and rocks and watched the strangers until sunset. In the dark they crept toward the tent, where a fire had been built, and at last one man ventured to speak. Then the strangers gave him money for the barley their mules had eaten and exchanged some of their biscuits for eggs and firewood, and asked many questions about the people and the country. These mountain folk regard a stranger with great suspicion and refuse to sell or give him anything. If he wishes a fowl or a sheep for food he must take it and afterwards pay the owner what he thinks is fair. If he asks for it he will be told that there is nothing. Since no minerals have been discovered in the surrounding mountains, and since the region is not on one of the great trade routes from the interior, these people have never been disturbed by white men and still lead the life their ancestors lived hundreds of years ago.

**A Cold Land in the Tropics.** One of the most serious defects of the great highland region of Peru and Bolivia is the lack of timber or a proper substitute for it. It is disappointing to find so little fuel in a land so cold at night. The traveler who visits Cuzco or La Paz in June and July (the southern winter) may find the weather very cold indeed, the people wearing overcoats in the houses, Indians standing about shivering, and yet no fires in the houses, no stoves or furnaces, no means at all for warmth or comfort. The reason is not difficult to find. There is little coal in Bolivia—none has yet been mined in the country—and there is practically no wood

within reach of the people of the plateau that can be used as fuel. Coal and refined oil, if used at all, must be brought from the United States, or coal may be imported from Wales or England, but at such expense that few people can afford them. Coal in the form of briquettes is brought in for the railway engines and for some of the engines of the mines, but it is exceedingly expensive. It costs at least four times as much as in England, or from fifteen to twenty dollars a ton.

**Cactus, Moss, and Dung for Fuel.** In the absence of ordinary wood and with expensive coal and oil some rather curious kinds of fuel are employed. First of all are the dry and resinous *tola*' bushes (Fig. 80). These are pulled up roots and all, piled into bundles, loaded upon animals, and brought often for long distances into the principal towns. Donkeys and llamas bearing the *tola* brush are driven right into the kitchens of houses and hotels, where their loads are removed. The *tola* makes a very hot and lasting fire, but the odor of the burning brush is disagreeably strong and fills the kitchen with blinding smoke and dirt. The traveler in the desert and the mountains often finds this bush his only means for making a fire. Sometimes the supply gives out in the country immediately about a mine or a town and then it must be gathered at greater and greater distances up to twenty or thirty miles.

Instead of baking bread frequently in an oven as we do, many South Americans of the coastal region and the mountains bake it only once every week or two in an out-of-door oven, dome-shaped as in Fig. 81. The lower part is made of adobe bricks and the upper part of a mass of adobe rounded off to a smooth summit. Into this oven are piled brush and wood gathered from far and wide, and a great fire built, until the oven is

thoroughly heated. When the fire has heated the oven it is raked out, the ashes are removed, and the loaves

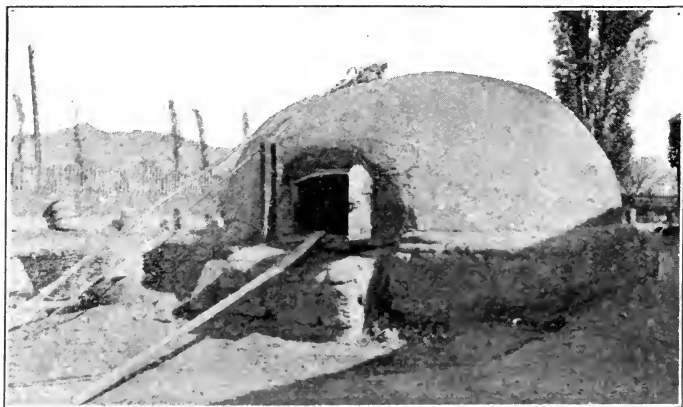


FIG. 81. *An out-of-door adobe oven for bread baking. These ovens are much like those built for domestic use by the early settlers in America*

are then put inside to bake. This is somewhat after the manner of the old-fashioned brick ovens of America, in use many years ago, except that the latter were generally built into the fireplaces.

Poor as the *tola* is compared with coal and wood it is still the best substitute that the country affords and will long remain the principal fuel supply of the common people. When the railways to the eastern plains are completed some of the abundant wood of that section may be brought more cheaply to the plateau, where it will find a market in the principal towns. Even with these railways, however, the poorest people will still have to depend upon the cheaper sources of fuel.

Another source of fuel for the people of Bolivia is unknown to us in this country—the moss that grows in lofty places in the mountains. It occurs in masses in some places three or four feet in diameter, and roughly

resembles a huge mushroom. The fuel value of this moss is due to the amount of resin it contains, and as the amount of resin in it increases with the altitude, the Indians who make a business of gathering it often visit extremely high places. One may see them collecting moss up near the limit of the mountain snows, sixteen thousand to seventeen thousand feet above sea level. Great amounts of llama dung, called *taquia*, are also gathered from the corrals and sold for fuel, just as in Tibet the dung of the yak is widely used. When mixed with moss and a little coal it burns readily and yields an astonishingly large amount of heat. On our own western plains "buffalo chips" were for years a source of fuel.

This combination of llama dung, moss, and tola brush is in many cases the only fuel employed at a mine far from the railway and the seacoast, a fact which emphasizes the general lack of fuel in Bolivia and the degree to which it hinders the growth of the country. The absence of fuel would not be felt so much if the abundant water power were used. If dams were built in steep mountain streams, and turbines and dynamos installed, electricity could easily be developed which would light Bolivia's cities and run her railway trains and do all the work of her shops. It will not be long before the people wake up to this fact and begin to use the water of the hundreds of mountain streams, many of which now run to waste.

**La Paz.** Perhaps there is no greater surprise in all South America than that which greets the traveler who for the first time sees La Paz. In approaching the city the train runs over a dry, treeless, and lofty plateau that stretches away mile upon mile north and south. Toward the east and on the rim of the plateau is a

magnificent line of snowy peaks. Suddenly, as if by magic, the whole world appears changed. One arrives at the brink of a vast amphitheater, with steep walls descending over a thousand feet to the city of La Paz (Fig. 83). It is as if the city were in the bottom of a vast bowl and the traveler on the rim of it. In the bright sunlight and clear sparkling air of the lofty plateau, the red-tiled roofs of the houses, the spires of the cathedrals, the green open plazas, the deep blue sky, and the majestic mountains with their mantle of snow form a truly wonderful picture.

The houses of La Paz are of stone or brick and adobe or sun-dried mud. The heavy walls are often unrelieved by decoration or ornament except the projecting iron work over the windows. The custom of barring the windows with iron is almost universal in South America as in Spain and Portugal, whence the greater part of the people came. In the days when the country was newer, the whites few in number, and life generally far less safe than now the custom was a very necessary one. Some of the houses and many of the shops and stores are painted in the gayest colors, bright blue rivaling that of the clear sky, bright green like that of the freshest plants and trees of the plazas, and the purple, orange, and pink of the splendid sunsets of this interesting land.

The fine central plaza of La Paz is ornamented with plants and shrubs, trees, flowers, and statues. The principal stores and hotels of the city flank it or are very near it, and here also we find the government buildings and the great cathedral of La Paz. The stone for the still unfinished cathedral is brought in part from the surrounding region but comes chiefly from a distance, and some of the stone used for veneer and ornament is brought by steamer from other countries

and shipped by rail four hundred miles from the coast.

**The Markets of La Paz.** The most interesting place in La Paz, if one cares most for the people of a city, is the great plaza in which the market is held and where all the Indian merchants of the town gather to buy and sell. Fig. 82 shows a portion of the market in which fruit and vegetables are sold. It is crowded with women squatting beside their baskets and piles of fruit. They are dressed



Courtesy of W. D. Boyce

FIG. 82. *A market scene in La Paz, Bolivia*

in the bright red, blue, and yellow of which the Indians are so fond, and wear curious little straw hats and ample shawls and skirts. Some of them go barefoot even in the coldest weather, while others wear sandals. A few of the wealthiest and many of the *cholos*, or half-breeds, wear fancy imported high-heeled boots and colored laces of expensive material. They do not seem to be very eager to sell their goods, but wait quietly for a customer, bargaining with him in a lazy, half-hearted sort of way.

The strange and abundant fruits and vegetables one sees in the markets of the plateau towns such as Cuzco,



La Paz, Oruro, and Cochabamba are always a source of wonder to one who has just crossed the cold desert mountains and plateau. Whence come all these tropical fruits, the oranges, bananas, chirimoyas, the nuts, sugar cane, and peppers, and dozens of other things that suggest tropical lowlands rather than a dry and cold plateau? If one watch the caravans arriving and departing one may soon see that they come from the low valleys and plains east of La Paz.

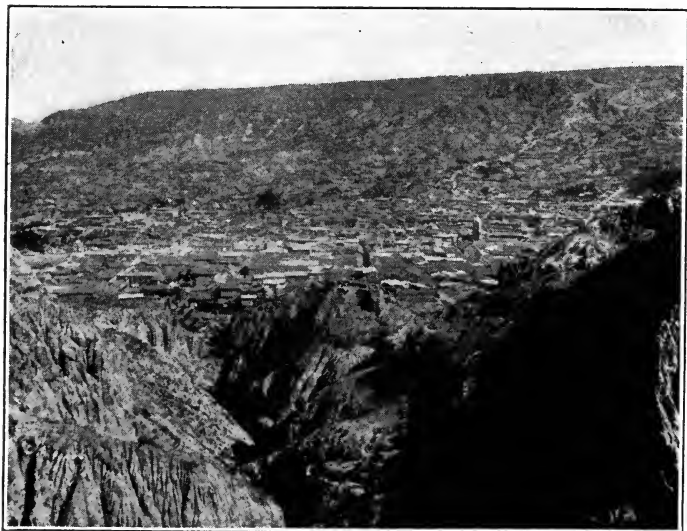
Going down the beautiful La Paz valley only a few miles one comes to a region very different from that about the city, and at still lower elevations is a land of well-watered gardens and fields, fine orchards, and a prosperous and contented people. The reason for all this lies in the more abundant rains of the lower valley. The lower the land the warmer it becomes, and the climate of the eastern valleys and plains is therefore spring-like and pleasant, not cold and disagreeable as on the lofty plateau. Every day, year in and year out, caravans are going up and down the La Paz valley, some carrying food from the gardens and fields to the great city, others returning with merchandise of cloth, candles, shoes, hoes, and spades, and the dozens of little wares of the town.

Some of the articles one finds in the markets of the plateau towns are of course produced on the plateau. Barley, meat, and wool are obtained from the flocks and fields of the plateau dweller. Here also are produced many varieties of potatoes that astonish the newcomer. In our country there may be many varieties of potatoes, but in the market they are all called potatoes. Not so in plateau Bolivia and Peru. Perhaps no one knows just how many kinds of potatoes here go under different names, but it is safe to say that there are at least a dozen. Many

are grown in the ordinary way and are harvested and sold in their natural condition. A frozen and dried variety, known as *chuña*, is very light in weight and is much prized by the Indians, who use it in making many kinds of soups, but to the foreigner it seems rather tasteless.

Besides the fruits and grains sold in all the plateau markets there are blankets made by the Indian women from the wool of sheep and llamas, ropes of llama wool, skins from the cattle of the eastern basins and valleys, leather sandals worn by all the plateau Indians in place of shoes, ornaments of silver and tin, cloth from other countries, the bright-colored shawls so well liked by the Indian women, and many kinds of household utensils made of wood.

**The Royal Cordillera.** Nothing else in Bolivia is so wonderful as the great mountain range east of La Paz



Courtesy of the Pan-American Union

FIG. 83. *View of La Paz, Bolivia*

that may be seen from the streets of that city and for great distances out upon the plateau. It is called the *Cordillera Real*, or Royal Cordillera (also thought to mean *real*, or dominating, Cordillera, as distinguished from the lower ranges of the Andes), and right well it deserves the name (Fig. 84). It is the crowning range of all South America and one of the greatest scenic features of the world. Sorata on the north, Huayna Potosí in the middle, and Illimani on the south are the dominating peaks and reach altitudes from nineteen thousand to twenty-one thousand feet above the sea. Illimani is the highest of them all and overlooks La Paz. Its white, snow-crowned summit stands out boldly on clear days, but is never completely exposed to view for a long time. Clouds gather about it almost continually, and snowstorms and mists enshroud its lofty peak almost every day in the year (Plates II and VIII).

For a long time Illimani was one of the unconquered mountains of the world. But in 1896 Sir Martin Conway, the great mountain climber, mapped the Cordillera Real and after several attempts scaled the lofty mountain. It was one of the greatest of the many achievements of this daring explorer, for Illimani is so high that to the natural difficulties of the ascent are added those due to the rarefied air and the incessant storms. For more than four thousand feet of the climb one is in the realm of cold, where blinding snow, slippery ice, and dangerous avalanches and precipices bewilder the explorer.

**A Day's Journey from Ice to Oranges.** The great Cordillera Real of Bolivia is in many senses a dividing range. Westward stretches the flat plateau of Bolivia; eastward are the deep mountain valleys and the river plains. It is in this border region between mountains and plains that one finds such great contrasts of climate

and of products, the marvel of every traveler. Think of riding in a single day from a bleak, cold, and lofty



FIG. 84. *Looking east over the great high plateau of western Bolivia, the snow-capped Cordillera Real in the background. A flock of llamas and alpacas is grazing in the middle distance*

range of mountains down through a region of eternal spring and camping at night in the hot mosquito-infested valleys on the edge of the Amazon lowland! That is what one may do near Sorata, and indeed in several places near the Cordillera Real (Fig. 84).

Fig. 85 shows a group of Indians harvesting potatoes at an elevation twelve thousand feet above the sea. It is a dry, cold, bleak, treeless land. In one hour's ride from this point is a mountain pass where snow covers the ground and a piercing wind chills one to the bone. In three hours more one is in the bottom of a warm valley where sweet-scented flowers fill the air with perfume, and trees and vines grow luxuriantly. At nightfall one arrives at a camp site where oranges and bananas grow, where the air is hot and damp, dense tropical vegetation covers hill and valley with a mantle of green, and strange and beautifully colored insects and birds brighten and enliven the forest.

In these steep valleys whose heads extend far into the

region of ice and snow and whose mouths are in the hot lands of the tropics one may find an astonishing variety of plants and animals. Up in the region of the snows only a few cacti and fungi grow, farther down grow the tola bushes, shrubs, and short grasses upon which the llama feeds, still farther down are the potato and barley fields of the plateau dweller, and then one gradually descends through the region of cornfields to that of coca



FIG. 85. *Indian villagers of the great Andean plateau harvesting potatoes at an elevation of 12,500 feet above the sea. On the other side of the mountains in the picture are heavy rains and dense foliage; here the people must irrigate their crops or plant them where the springs come out of the ground*

orchards, from coca orchards to orange groves, and at last to the land of the plains, the land of cacao and rubber.

**Plateau and Valley Contrasts.** The habits and customs of the people of these different regions are as unlike as the products. In the higher portions of the land one finds thick-walled houses; in the lower valleys the climate is so warm that the houses have no walls at all. It is so dry on the plateau that while the roofs are made thick to keep out the cold they are pitched at a low angle; in the valleys the roofs are steep and thick not to keep out the cold but the better to shed water. On the plateau the people sleep in closed houses and under warm blankets; in the valleys they sleep in hammocks or on benches in open rooms.

The plateau Indian rarely goes where his precious llama will not go, and the llama is a child of the cold, forestless plateau. If taken down into the warm valleys it will become sick, and if kept there long it will die. If the Indian of the plateau goes down into the valleys and plains he is not so comfortable as on the plateau, and if he stays on the plains he may quickly become ill and die. Thus the mountain climate and the valley and plains climate are so dissimilar that they have led to the development of two groups of people wholly unlike. In the past their differences often led to war, but in these days of multiplying trade routes they are glad to exchange their various products and live on friendly terms.

## CHAPTER VIII

### THE INCA KINGS AND PEOPLE

**A Powerful Ancient Race.** Upon the high plateaus of Peru and Bolivia one sees to-day a most interesting race of Indians. Their ancestors were subjects of that great Inca empire whose wise laws, deep religion, splendid palaces (Fig. 86), and fine aqueducts are among the wonders of the world. Even to-day the plateau Indian in his bright-colored blanket and cap, with his quick trot, his mysterious silence and grave looks, is an interesting creature. What must he have been in the days before the coming of the Spaniards? Now his spirit is broken by misuse and he is awed by the powerful white man whom he serves. In the days of the Inca empire he was a soldier in the army of the king, he fought and won great battles, made long, dangerous marches, and tamed even the grim mountain slopes for his flocks of llamas and the silver of his splendid temples.

**The Civilized Indians of the Plateau.** The early Spanish explorers found to their surprise that parts of the New World were peopled by Indians who were not wild and savage, but partly civilized. In Peru, as well as in Mexico, there was found a great Indian nation, with laws, government, taxes, well-drilled armies, great forts and temples, and an elaborate religion. It is peculiar to both the Mexican Indians and those of Peru that their great civilization was developed upon a high table-land or plateau. We shall understand this fact if we remember that upon the wet lowlands in the tropics, where great heat is the rule, man finds progress all but impossible. The intense heat, as well as the dense

vegetation, prevents man from developing into the intelligent race type that is found in the cooler zones, in which France, England, the United States, Chile, and other progressive countries are located.

There is one exception to this rule. Even in the tropics a cool climate may be found where there are mountains and plateaus. In fact, if one only goes high enough one may find mountain peaks with perpetual snow and ice upon them. Chimborazo at Quito rises twenty-one thousand feet above the sea. Its snow-capped summit may be seen on clear days from Guayaquil itself, one of the hottest cities in the world. The cold of high elevations even in tropical regions may be as intense as is the heat of the lowlands. Between these extremes, if only one will seek the right altitude, a moderate temperature may

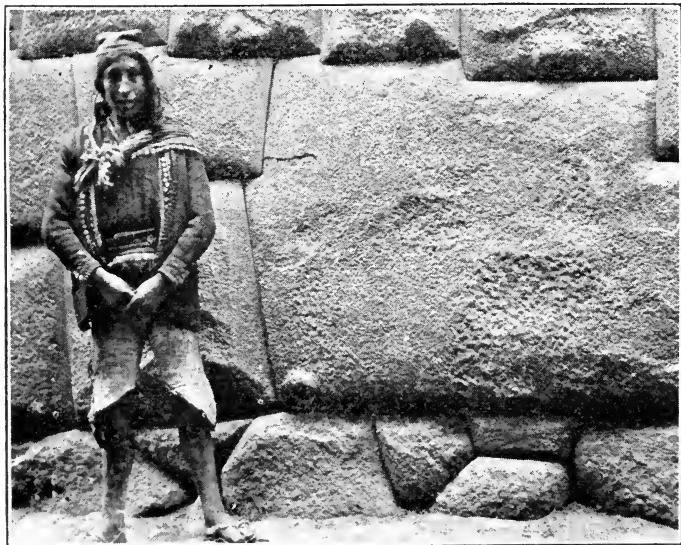


FIG. 86. *A twelve-cornered stone in the Inca palace, Cuzco, Peru*



always be found, neither so hot as to prevent man's development nor so cold as to drive him away. This intermediate level is situated between seven thousand and twelve thousand feet. If the amount of land between those elevations in a given region is small, few people can occupy it, and there will not be offered a chance for growth; if the amount is large there will be room for spacious fields, wide pastures, great cities, and many people. In short, there will be room for a nation and a chance for civilization to develop.

It requires but little study of the map (Fig. 64) to show how much of Peru and Bolivia lies at this favored height, where cool weather, clear skies, and water for irrigation may be found. It was very natural therefore that the Indians who dwelt there should be more progressive than their neighbors in the tropical jungles of the Amazon valley. They were more alert mentally. They built great cities and towns, among them Cuzco, the capital of the Inca empire (Fig. 87), and this the hunter in the forest never does. They lived by farming chiefly, with some grazing; hence there were more people in a given area than can be found in a forest where men hunt and fish over wide spaces for a living. Life in such a highland region may be easy, but never so easy as to make men lazy; it is hard, but never so hard as to discourage men and turn them into savages or prevent them from becoming anything more than savages. We must conclude, then, that it is in large part the climate upon these highlands that resulted in the rise of the great empire of the Incas which stretched for hundreds of miles from Ecuador to Chile and from the eastern edge of the Andes Mountains to the Pacific coast.

**The Inca Kings at Work.** The Inca Indians were remarkable in many ways but perhaps most of all for the

way in which they adapted themselves to the country in which they lived. It is so dry upon the table-land where

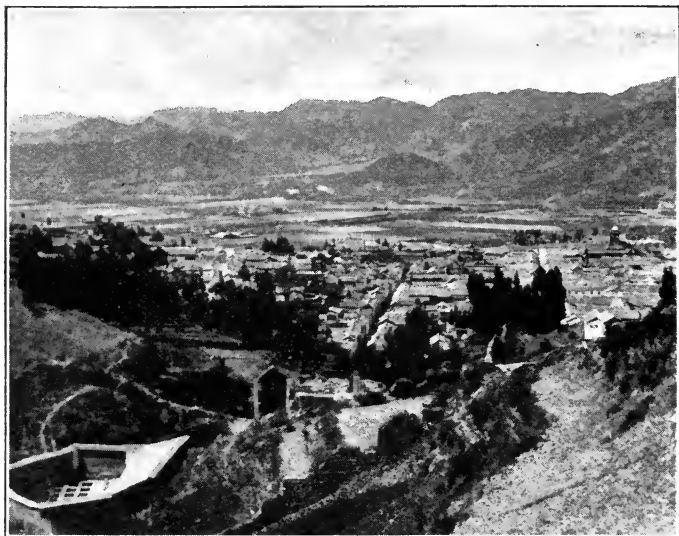


FIG. 87. *The city of Cuzco, Peru, the ancient capital of the Inca empire*

they dwelt that, although some grass and potatoes will grow without irrigation, the best crops can be grown only where water is applied to the land. The Inca kings were very intelligent men and taught their people how best to conduct the water along canals to their fields of millet and corn. They taught them industry and skill. Every year the king himself went out into a field near Cuzco and guided the plow to show his subjects how necessary it was to work, and how important were the farms upon which the people had to depend for food. Of course, after that, no man felt ashamed to plow or to do other work in the fields, for the king himself, in sight of all the people of Cuzco, had plowed a furrow and worked with

his hands and soiled his feet with earth. This dignified labor. It made men want to do what the king had done. It made them proud of their work.

**The King's Agents.** Another thing these kings did that was of great help to their people. They sent intelligent men through the land to find out for what products each part was best suited. If they found a spot where ignorant people were growing potatoes and where corn would grow much better, they made them grow corn instead, and then exchange what they did not need for potatoes grown somewhere else. In this way they organized their subjects into a great family in which each group worked for the good of all the people. If the crops failed in one place on account of the lack of water, the people whose crops were good had to give up a part of their harvest to the poor.



FIG. 88. *A splendid church on the central plaza, Cuzco, Peru*

**Crops for Taxes.** The kings also helped trade. They urged the people of the mountains to visit the people of the valleys and plains and exchange the wool and meat of their flocks for the dried fruit and grain of the farms in the valleys. They were very careful in taxing the people to make them pay only what was fair and what they could easily get. Of course a government can be run only by taxing the people who are governed. This



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FIG. 89. *Selling potatoes in their native landmark before Jesuit Church and College, Cuzco, Peru*

tax supports an army, which is always needed for defense; it pays the men who work for all the people; it allows the building of forts for protection and temples for worship—an important thing in the religion of the Incas. The men who grew potatoes sent a part of their crop as tribute to Cuzco, those who kept flocks of llamas sent wool, those who grew corn sent corn. In this way the taxes were easily collected, for no man felt his tax a burden. The kings even taught their subjects to be clean in person and in their towns, and sometimes punished them for disobedience in regard to cleanliness.

**The Worship of the Sun.** - The different families of Indians in North and in South America had a great many kinds of religions. Each religion or belief had certain features that grew out of the kind of place in which it was known and practiced. Like all the other Indians the Incas had their own religion. They regarded it very highly and paid a great deal of attention to its rites. The great central object of worship was the sun, which was regarded as the source of all life, the giver of all benefits, the caretaker of the world. This is a very natural sort of belief to an ignorant Indian.

On the night of June 21, the shortest and often the coldest day of the year in the southern hemisphere, many of the Indians of to-day still follow one of the old Inca customs. They build fires at every important street corner in the cities and towns and on every prominent hilltop and mountain in the country. They say that they do this to bring back the sun, which is then farthest north; and also to prevent the stones and earth from becoming so cold as to crack open from the frost. The custom is a pretty one, and the night is made extremely picturesque by the fires gleaming on all the hilltops roundabout. It reminds one of the games the Eskimos play and the

sacred rites they observe to bring back the sun to their cold northern land. Small wonder, then, that the Incas worshiped the sun as the giver of light and warmth. Its light beautified the earth; it gave life to the growing plants and warmth to man after the cold night. To one who has experienced the night temperatures on a high plateau it seems not at all strange that these Indians should regard the sun with awe, and should even build up a religion based on the worship of the sun.

**The Prayers of the Sun Worshipers.** Many of the forms of the Inca Indian's religion are of great interest and even beauty. Some of their prayers are framed in very simple language and express deep faith that their petitions to the sun will be answered. Many of them have been written and preserved for us by an Inca Indian who lived in Peru at the time of the Spanish conquest. He was educated in Spain, and when he became old, wrote out in Spanish the history of his people. The book is now printed in English also, and is one of the most interesting stories in the world. Its author was Garcilasso de la Vega, to whom we owe much of our knowledge of Inca customs and beliefs. Some of the prayers he wrote are worth reading here:

*Prayer to the Creator*

" . . . Thou who givest life and strength to mankind . . . and vouchsafest that men live in health and peace, and free from danger: Thou who dwellest in the heights of heaven, in the thunder, and in the storm clouds, hear us! and grant us eternal life. Have us in thy keeping, and receive this our offering, as it shall please thee, O Creator!"

*Prayer to the Sun*

"O Creator! Thou who gavest being to the Sun, and afterwards said let there be day and night, raise it and cause it to shine, and preserve that which thou hast created, that it may give light to men. Grant this, O Creator!"

In their prayers one finds reverence for all the important

things relating to daily life and common food. The Incas worshiped all mountain passes as places where, the hardest part of the journey ended, one might rest before beginning the descent. Even the Christian Indian to-day frequently worships at shrines built on mountain passes. The Inca Indian also worshiped the wind and running water. On this dry and cool plateau plants need besides soil two things in favorable amounts, water and sunlight. The precious water, led carefully out over the fields and gardens, was an object of great importance and therefore of worship. The lightning and the thunder were the voices of unseen spirits and were feared. So also, the Inca Indian feared to go up into the highest places of the mountains, for the mountain sickness which troubled him there made him believe that the lofty places were peopled by evil spirits which, being angry at man's intrusion, drove him out of their home with sickness and pain.

**Prescott's "Conquest of Peru."** The boy or girl who has not read Prescott's *Conquest of Peru* has yet to enjoy one of the richest and most fascinating stories of history. In that work the great American historian tells in a simple way the story of the Inca life and religion. Prescott was especially impressed with the worship of the Incas and the temples they erected for that purpose. He described particularly the Temple of the Sun in Cuzco, the capital of the Incas, where the kings dwelt and where all the people came once a year to attend a great feast in honor of the sun.

**Some Indian Palaces and Temples.** The photographs (Figs. 86 and 91) give one an idea of the great walls in these temples and the great size of the stones in some of them. Fig. 90 shows the base of the Royal Palace. The stones are all well trimmed and fitted to make a wall which no one can fail to admire.

In the view (Fig. 86) is shown the largest stone in the palace. Its height may be judged from the Indian who stands beside it. It has twelve angles or corners, and into each another stone is fitted with perfect nicety. So accurately have the different sides of each stone been trimmed that it is impossible in many places to insert the point of a needle between two faces in contact with each other. This is the more remarkable when we consider the tools with which these men worked. They were not acquainted with the use of steel but employed a chisel, ax, and hammer made of impure copper. Pure copper is soft and cannot in its natural state be used in making a cutting tool.

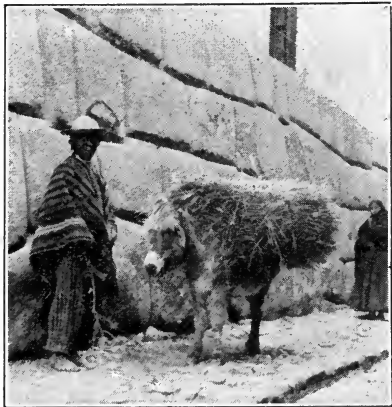


FIG. 90. *Donkey loaded with straw for fuel, on street in Cuzco, Peru. The old wall to the left is part of the building in which the Inca kings once lived*

But these Indians knew how to take impure copper and treat it so as to make a kind of bronze often wrongly described as "tempered copper."

Another very remarkable thing about the old buildings of the Incas is the great size of many of the stones one finds in the walls. The photograph (Fig. 91) shows one of the largest stones used in building the great fort (Sacsahuaman) (Fig. 92) that

overlooks Cuzco from the summit of the hill on the northern edge of the town. This stone is about fourteen feet high and has been estimated to weigh a hundred tons. We should find such a stone exceedingly hard to move even with all the large hoisting machinery that we



can command. To the men of ancient Cuzco, who had no such machinery, the task must have been incredibly difficult.

Even the streets of old Cuzco were paved by the industrious Incas. From the quarries about the city paving blocks were gathered and laid down in regular fashion, just as we pave a city to-day. To supply the city with water a long aqueduct was built, several miles of it consisting of a tunnel cut part of the way through solid rock. The fact that these old canals and tunnels still exist speaks well for the ancient builders, who seem to have built as the Romans built, not for years but for centuries, not for men but for gods.

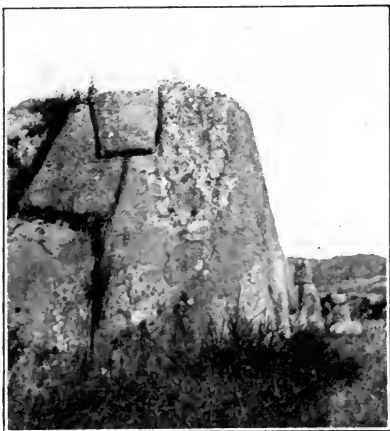


FIG. 91. One of the huge stones in the walls of the old Inca fort (Sacsahuaman) near the city of Cuzco, Peru, the old capital of the Incas

The Inca kings ordered roads to be built to the four parts of their empire. They were made very carefully, as was the rule in everything. In places they were cut in rock; in still other places they were graded and smoothed. Through the desert, where shifting sands make road building expensive and where the sand so quickly covers a roadway, they erected poles and piles of stones as signs of the way, *signos del camino*, as they are called in the Spanish to-day. The chief defect of these highways may be seen at stream crossings, where the traveler looks in vain for a bridge. Although the Incas

were familiar with the keystone they never learned the secret of employing it in the making of a stone arch which might serve for a bridge.

Upon the imperial highways the kings themselves journeyed to see the different parts of the empire and to become acquainted with the people so that they might rule more justly, somewhat in the spirit in which the President of the United States now travels about. The



FIG. 92. *Walls of the old fort at Cuzco, Peru, on the top of a hill near the town*

Inca king desired to let the people know that he was interested in the welfare of all kinds of men in all parts of the country, and he even went to the seat of war when it became necessary to encourage the armies to better fighting.

**The Inca Empire.** Nearly all the Inca kings attempted to extend the boundaries of their empire by war and conquest. At the time of the coming of the Spaniards, about 1535, a vast extent of country was governed from Cuzco. The empire ran from Ecuador on the north to central Chile on the south, and from the Pacific shore to the very edge of the tropical plains east of the Andes.

On the north the Spaniards found the Quitos, a race of Indians almost as remarkable for their great temples, their religion, and their intelligence as the Incas on the south. These fought with great courage and successfully resisted all attempts on the part of the Incas to conquer their country. Into central Chile the Inca kings sent some of their best armies for the conquest of the Araucanians, a fierce and warlike people. But here again they met with a resistance so strong that they had to stop fighting and content themselves with the northern part of Chile, the arid region now known as Atacama.

Although fine armies were sent eastward to conquer the Indians of the tropical forests and the plains, and though forts and roads were built in that direction for the same purpose, the Incas never were able to extend their empire very far eastward, not because the Indians of the plains fought better than the Inca armies but because the unhealthy country itself was their worst enemy. Malarial fever and many other tropical diseases as well broke out among the soldiers; they could not withstand the stinging insects which are found in great numbers on the plains; the climate is exceedingly hot and the air so damp that the heat is felt much more than in a dry country; and the forest itself is marked by tangled undergrowth, trackless expanses, and dangerous animals. It is easy to see therefore that the Inca empire had its boundaries determined as much by the nature of the country as by the kind of people who resisted the armies of Cuzco.

**The Inca Religion.** In those valleys in which the people fought against the Incas they did so chiefly because they did not like the Inca religion. The Incas demanded that all conquered peoples should worship the sun or be punished; but, said the people of the coastal valleys,

even a fool could see that the sun was an object to be hated and feared, not to be worshiped and loved. For did it not wither their corn and dry up their fields and burn the earth? No, as for them, they were not going to accept a religion in which they had to worship the sun. Rather would they keep their old religion, in which they worshiped water and fish, the one because it gave life to the earth, the other because it supplied food to the people.

The reason for this strong difference of opinion is easy to see. The Inca religion grew up on the plateau where it is so cool that the sun is desired and loved, while the people in the low coast valleys lived in a hot country where the sun's effects are often destructive to crops. At last the difficulty was overcome by a compromise. The people of the coast were allowed still to worship water and fish if they chose, but they must also build temples to the sun and worship in them. Thus there grew up along the coast a most curious mixture of Inca and Yunca religion, one part consisting of what the people wanted to believe and the other part of what they had to believe.

It is a remarkable fact that many people eagerly accepted the Inca rule. This was due entirely to the fine systems of irrigation which the Incas always established in a conquered province and to the good and wise laws they always made. It was really better to belong to the empire and to be protected and ruled by a wise king than to be continually at war with quarrelsome neighbors. There was also something splendid in the religion of the Incas. Its rites and ceremonies were grand and impressive, its prayers were about food and water and the sun, and all these things pleased people for whom life held few pleasures except the commonest, and to whom the chief concern was the getting of their daily bread, fairly wrung from a stubborn earth.

**The Cruel Wrongs of the Spanish.** With the arrival of the Spaniards in Peru there was brought about a complete change in the life and religion of the people within the empire of the Incas. The Spaniards easily took possession of Cuzco, for they had firearms while the Indians had only the simplest kinds of arms—stones and knives. The last king of the Incas, Atahualpa, was tried and cruelly put to death. Some of the temples were later torn down and the spaces between the stones searched for gold, the altars were despoiled of all their ornaments of gold and silver, the people robbed of their possessions, and other wrongs inflicted. Men and boys were compelled to work like slaves in the silver and gold mines in order that the inhuman thirst for wealth on the part of the Spaniards might be gratified. At last a better spirit came to rule among them. The Indians were given some rights: they were no longer compelled to work in the mines; property could not be stolen from them; they could no longer be abused and whipped.

With all these changes came a change in the religion of the Indians. They no longer worshiped in the temples of their fathers. Priests from Spain established the Catholic religion and built great churches and cathedrals; some of them, indeed, were built on the ruins of former temples (Figs. 88 and 89). In place of the rites and ceremonials of the Inca worship of the sun came the prayers, the processions, and the solemn music of the Christian religion as practiced by the Catholic Church. To-day the ancient religion is in many places no longer even a memory. If one steps into a cathedral in La Paz or Lima or Cochabamba, one finds within it many Indian worshipers whose god is no longer the sun, and who join in prayers not so much for rain and full streams as for the faith, hope, and love of the Christian religion.

## CHAPTER IX

### THE PLAINS AND INDIANS OF EL GRAN CHACO

**The Empty Spaces of the Gran Chaco.** The mystery of that large blank space on the maps of the Argentine and of Bolivia that represents *El Gran Chaco* (Plate II) is realized by only a few people. There are tracts as large as the state of New York of which we know practically nothing; in others, white settlements are absent for hundreds of square miles; in still other places in the Gran Chaco live Indian tribes of which little more than the name is known. Government enterprise, however, is now opening up the best sections of the Chaco. The Argentine is spending large sums in an effort to colonize the region. Already some of its rivers have been explored and improved, and it is expected that two railway lines will soon be built through it. Improved means for trade will transform this land of mystery into a settled region, for its pastures and its soil are rich though its water supply is not everywhere good. Along the foot of the mountains, where water may be obtained from the streams before they have begun to fail, plantations of rice, sugar (Fig. 93), and cotton are already established as far as the railway affords a means for cheaper transportation (Fig. 94). Large tracts near the Paraguay have recently been purchased for cattle ranching. American cowboys have been imported to care for the herds brought in from the south (Fig. 96). It will not be long before at least short railway lines will extend westward from the Paraguay and open up a vast cattle country (Fig. 95). The quebracho forests are another source of wealth in the southern part of the Chaco (Fig. 97). They

furnish a hard wood used for railway ties and fence posts, and from the wood a tannin extract is produced. Over ten million dollars' worth of quebracho wood and extract are exported each year. Half of this goes to the United States. The tannin is made in little factories on the edge of the Chaco and in the neighboring Argentine provinces of Santa Fé and Santiago del Estero. Large foreign companies have in the past few years begun production on a big scale. One company employs between four and five thousand men.

**The Rivers of the Gran Chaco.** The Gran Chaco is so large that it is not contained in any one republic. It extends through Bolivia, Paraguay, and the Argentine, where these meet in a common boundary at the northern end of the Argentine (Plate II). About the borders of this vast tract men have traveled for exploration and trade, have seen the Indians who inhabit the country, and along two lines have crossed it in some numbers on business.

Since the rivers play so important a part in the development of a new country, it is worth while to see what the river systems of the Gran Chaco are like. The Paraguay is the chief river on the eastern border of the region, and has its sources far toward the north, well within the heart of the South American continent. It is so large as to be navigable two thousand miles above Buenos Aires to the port of Corumbá, and smaller boats go even farther. It is therefore one of the routes of trade, the outlet for a vast region where rubber, cacao, and hides are produced. From the west it receives several tributaries almost as long as the main stream; from the east no rivers of any size join the Paraguay.

Among the rivers that join the Paraguay from the west the Bermejo and the Pilcomayo are the most important.

The Pilcomayo is by far the longer but the Bermejo alone has been used for trade. The head of navigation on the

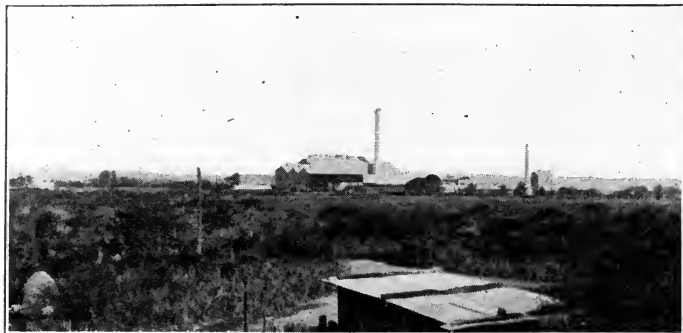


FIG. 93. *Sugar works at Ledesma, north-central Argentina, near the border of the Chaco country*

Bermejo is Oran, and thither canoes and flat-bottomed boats in considerable numbers formerly came from Buenos Aires, more than eighteen hundred miles away. The journey was extremely difficult owing to the shifting sand bars, the low water, the great heat, and the pest of insects. The expense involved in carrying goods by river boats was enormous, and only the remoteness of the provinces of Jujuy, Salta, and Tarija, and the length of other routes to them, made men take the Bermejo route. The government has recently deepened it so that it has a regular steamboat service for some distance above its mouth.

**The Mysterious Pilcomayo River.** The great neighbor of the Bermejo, the Pilcomayo, has long been one of the geographical conundrums of South America. Both its headwaters and its mouth have been known for many years, but the middle course of the river has remained almost unknown, on account of the swamps and the fierce Indians. Crevaux, the Stanley of South America, whose explorations have been among the most important



of any made there, lost his life trying to discover the secrets of the great river. While making his way down the stream in 1882, he was treacherously killed by Tobas Indians, who live in force along the middle course of the stream. Eleven other explorers in turn met defeat in attempting what Crevaux failed to do. In 1898 Ibaretta, the last of them, met the common fate.

But one man has traveled from the headwaters of the river to its mouth. Thouar, a Frenchman, went from the upper Pilcomayo to Asunción on the Paraguay. He and his men were obliged to eat their mules and dogs, and were found by hunters in a half-starving condition near the mouth of the great river. So difficult had been their journey that they had no energy left to look about them and see what the country was like, and but little was learned from them. Pages, a captain of the Argentine navy, tried to ascend the river, building a series of dams below his small steamer to secure navigable water, but he was obliged to abandon his vessel in the marshes and at last barely escaped with his life.

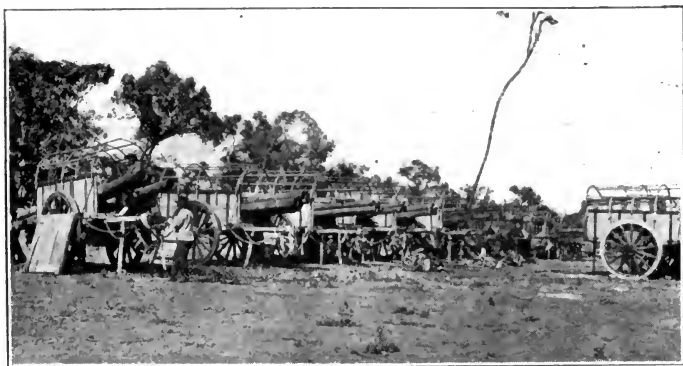


FIG. 94. *Iron pipe hauled on mule carts from the end of the railway in northern Argentine to the oil fields of south-central Bolivia*

In 1905 Gunnar Lange undertook to make a thorough study of the geography of the Pilcomayo, to see if the



FIG. 95. *Chaco cattle in the desert of Atacama, after a twelve days' journey across the Cordillera between Salta, Argentine, and San Pedro de Atacama, Chile*

river were at all navigable, and to discover its exact nature as a route of trade. The party under Lange consisted of thirty men. Beef animals and canned provisions in large quantities were sent ahead of the expedition to the swamp region of the lower Pilcomayo where the real work began. Lange crossed the salt swamps with their interlacing streams by using oxen to drag the boats. The expedition finally reached a point above the swamps seven hundred miles from the mouth of the river. So salty were the swamps that drinking water was obtained with the greatest difficulty.

The expedition discovered that the banks of the stream for seven hundred miles are lined with dense forests of both hard and soft woods. On low mounds among the marshes and on higher ground away from the river are

splendid pastures. Were a channel opened by dredging and the swamps drained it would be possible to turn vast tracts of the Pilcomayo valley into grazing land and produce large numbers of cattle. At present cattle would have to be driven five hundred miles to the Paraguay through a country where pasturage is not always easy to secure, and where the water is stagnant and unfit to drink.

**The Road to Santa Cruz.** There is a strip of country across the northern Gran Chaco that is now well known because of the fact that through it Santa Cruz de la Sierra, one of the larger cities of Bolivia, finds an outlet to the sea. The water supply over this route is not good, and sometimes cats called "tigers" kill the oxen and increase the delay. By oxcart it takes from two to five months



FIG. 96. *Gauchos of the Chaco at Embarcación, northern Argentine. The heavy cowhide flaps on the saddle front are a protection against the thorny shrubs through which the cowboy must ride in rounding up his stock for the long drive to the end of the railway*

to cross the Gran Chaco; and about two weeks if one is fortunate enough to get mules. If the road is very bad

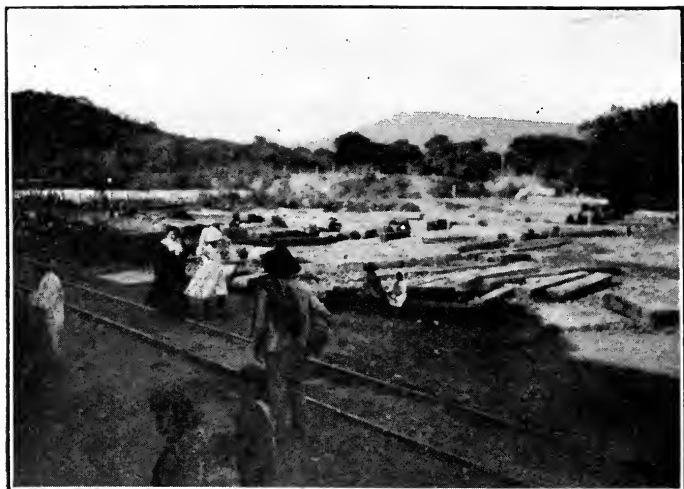


FIG. 97. *Quebracho logs, "northern Argentine*

goods cannot be moved at all. The oxcarts used here are great, lumbering, two-wheeled vehicles built very strong on account of the ruts, roots, swamps, and stream crossings without number.

The Indians of the drier regions manage to sustain themselves by using water stored in the vertical leaves of the cactus and by squeezing out the juice of the large pulpy water-potatoes. Both travelers and natives suffer much from the mosquitos and also from the barbs with which all the plants are armed. The most acceptable present to a Chaco Indian is a shirt, which is at once a cover at night and a partial shield from the thorns and saw grasses by day.

**The Trade of Santa Cruz.** One wonders why in the face of these great difficulties people ever came to settle

at Santa Cruz, one of the oldest towns in Bolivia and yet one of the most remote from the sea. It was founded by Catholic missionaries and for a long time was a center of religious teaching. Its full name signifies "Holy Cross of the Sierras." Its importance from the first was due to the manner in which the streams radiate from this locality, thus giving exploration parties the choice of several routes through the river plains of the upper Mamoré. It early became the center of a cattle industry, for which the grassy plains about it are admirably fitted, and on account of its position near the mountains it has the very great advantage of a climate cooler than the plains towns enjoy. Since the rubber tree has become so important Santa Cruz has grown rapidly. Its position at the headwaters of the Mamoré gives it an important part in the trade of that stream and its neighbors,—the Yapacani, Rio Grande, and others. Though most of the Bolivian rubber is sent down the Madeira and the Amazon to the Atlantic, a part of it is taken in canoes, batelões, and oxcarts to Santa Cruz, where it pays the bills of the rubber men who have bought goods of the merchants of Santa Cruz. Thence these merchants ship it by oxcart to the Paraguay and river steamers deliver it to the docks of Buenos Aires.

**The Fierce Tobas Indians.** Few Indian tribes of South America are really dangerous to whites, but of this number the wildest groups among the Tobas might well stand at the head of the list. The whole group numbers about twenty thousand and its members live principally along the middle Pilcomayo. A tribe of the Tobas living in the Argentine Chaco have a more peaceful character, some of them working for part of the year upon the sugar plantations of the whites; others living in the recesses of the forests and swamps manage to

resist all attempts at conquest. Although one military expedition has been sent against them, they have never been reduced and are still one of the most serious difficulties to be overcome in the development of these remote grasslands. Early in 1913 a half dozen whites near the lower Bermejo were killed by Tobas. They are typical red men, tall, muscular, bony, with long black hair. They are extremely wary and have few words either among themselves or for the stranger.

"We saw four Indians come stealthily down to the bank armed with long lances. Then lying down among the reeds, they gazed silently into the water till they saw some big fish pass by, when, with wonderful skill, they speared them one after the other, and threw them on the bank. Next they lit a fire, roasted the fish they had caught, and devoured them. This done, they picked up their weapons and crept back into the woods as noiselessly and stealthily as they had come. The whole time—some three hours—not one of these men spoke a word; they gave the necessary directions to each other by slight inclinations of the head only." (*Knight.*)

In the simple and primitive life of most tribes of Chaco Indians the customs and habits closely reflect the geography of the region. When the cold south wind blows they take off their blankets and shake them, saying that they are shaking out the sickness, colds, and influenza which this wind always brings. They sprinkle the blood of a duck in order to make rain in their dry scrub country. When a rainstorm rises they wait until it has passed overhead; then they push with their hands and shout, "Away! Away!" On cloudy days an old man holds a firebrand up toward the sun that it may shine again. *Kyaiya* is the name of a feast which is held each year to welcome back the spring, with its balmy winds and green foliage.

## CHAPTER X

### PARAGUAY

**A Country that gives its Name to a Tea.** It has been said by a traveler that if all the tea that grows in Paraguay were brewed at one time there would be more than enough to furnish a cupful to every man, woman, and child in the world. It is one of the chief products of Paraguay, and so much has been raised there and shipped to other countries that many call it Paraguay tea. In South America it is called *maté*. It grows in groves and even in forests of tea. Think of a land where tea is so abundant that there are hundreds of square miles of it growing wild! In some places it covers all the mountain slopes in woods known as *yerbales*. At one time the Jesuit fathers cultivated it in plantations so as to improve its quality, but since their expulsion there has been no real system of cultivation and the trees grow wild.

Paraguay tea makes a very cheap beverage and is said to have excellent effects without harming the nerves of the people who drink it. It is used in Brazil, where it is now grown for the market in greater quantities than in Paraguay; the gaucho of the Argentine pampas finds it an almost indispensable drink; and even the distant Tehuelche Indians of the Patagonian plains use it in considerable quantities. Perhaps at some time in the future its use will become much more general and we may find ourselves drinking tea from Paraguay and Brazil as well as from China and Japan.

**The Orange Groves of Paraguay.** Scarcely less wonderful than the forests of Paraguay tea are the great orange

groves. Oranges are so plentiful there that they are fed to the pigs as the farmers of Illinois feed corn to their live stock. On the streets of some of the Paraguayan towns one may buy thirty oranges for a cent. Oranges are handled like potatoes or wheat in this country and not in the delicate way in which we handle them in the United States. If one orange is harmed there are a dozen to take its place; and where thirty may be had for a cent who cares whether there is one orange more or less? One finds oranges and orange groves everywhere: along the river banks, about the country and city houses, in parks, in the forest, on the hillsides; wild oranges, cultivated oranges; oranges so plentiful that they belong to any one who cares to pick them up. Their cost depends merely on the labor of gathering them, which amounts to almost nothing.

Sometimes steamers come up the great rivers of Paraguay and take on a load of oranges to sell to the people of the Argentine or Uruguay; and then the river front presents a pretty sight. Great loads of golden oranges are carted to the river bank and women begin loading them into baskets in which they carry them on board the boat. Dozens and sometimes hundreds of women may be at work at one time taking the place of the machinery with which boats are generally loaded.

**A Country of Few Men.** If we think of the size of Paraguay we call it next to the smallest country of South America; but if we think of the number of people in it we say that Paraguay is the smallest of all South American countries. There are fewer people in Paraguay than there are in Ecuador or even in Uruguay. But a more peculiar thing than the small number of people in Paraguay is the small number of men. A moment ago we read that women load the orange boats, and if we should travel in Paraguay we would at once be struck with the fact that women do



almost all the work of the country, whether it is easy or hard. Paraguay is essentially a country of women.

It came about in this way. At one time Paraguay had a very despotic ruler who governed the people harshly and quarreled with his neighbors. Finally he got into serious trouble with Brazil, the Argentine, and Uruguay, and with all of them at the same time! So these countries banded together, collected their gunboats and armies, sailed up the Paraguay River, and then marched out over the country and drove the Paraguayan army from one place to another until it was entirely destroyed. So many men lost their lives during this war that when it was ended there were scarcely enough men in the country to do its business. Three fourths of the whole population had been destroyed or driven out, and when the war ended there were only about two hundred and fifty thousand people in the country. This war lasted from 1865 until 1870. Since then the population has been steadily increasing and now numbers but little less than a million.

**Physical Features.** The western portion of Paraguay consists for the most part of flat plains upon whose surface the water stands during the wet season (Plates I, VII, and IX). Every year when the rivers are in flood the banks are washed away, the river overflows, and the region is covered with water for miles and miles. This makes the country very unhealthful and fevers, especially malaria, are common. Also, the farther north one goes the hotter it becomes and the more difficult it is for the white man to make his home. Southern Paraguay is cooler and its climate has been described as spring-like, but whether or not one calls it spring-like depends upon the spring one is accustomed to have at home (Plates V and VI). Perhaps it is spring-like to a Cuban or a Guatemalan, but to an American it seems decidedly tropical. Nowhere in

Paraguay are there high mountains, but in the eastern part of the country there are mountains that rise two thousand or more feet, their tops covered with forest.

But little is known of the interior of Paraguay except that in the remote parts of the country live Indian tribes that have scarcely ever seen a white man except the slave raiders who range the forest capturing the natives to work on the rubber plantations. Once in a while a white traveler makes an expedition into the northern country and after terrible hardships comes back to tell of the fever-ridden land where the climate is bad and where the few people are very much afraid of the whites.

**The River that gave its Name to the Country.** Among the rivers of Paraguay we should learn first of all of the one for which the country is named. Running for the most part through a flat country, the Paraguay has no falls or rapids in its course; it has, however, so many turns and curves that the distances from place to place sometimes measure several times as far by river as in a direct line. Steamers go up the Paraguay to Corumbá, Brazil, and very small steamers and launches even go up as far as



Courtesy of the Pan-American Union

FIG. 98. *Asunción, capital and largest city of Paraguay*

Cuyabá, where all direct connection with the outside world ends and where one plunges into the vast forested interior of South America. The course of the river is most uncertain and with every flood the pilots of the river boats must learn the channel all over again, for the curves and the sand banks change their position constantly. Slowly the railway is being pushed up the valley, but it will take some years to reach Corumbá. Then it will be easy to travel into the very heart of Paraguay, and explorers and merchants will make known to us what the great interior spaces contain.

**The Great Falls of the Paraná.** The most interesting river in South America after the great Amazon is the Paraná (Fig. 26), whose volume is greater than that of the Mississippi and whose basin contains falls that rival Niagara. The muddy flood of water that forms the Paraná comes down through a great primeval wilderness of swamp and forest, and the borders of the stream are lined with dense tropical vegetation. In the main the lower course of the river is very flat and boats may easily sail against the current. From the deck of a river steamer one sees distant forest-covered mountain ranges with hazy blue summits and indistinct outlines. Beyond the end of the steamer journey one comes to the falls of the Paraná, also called the "Seven Falls" because in time of low water the broad river is split up into a number of separate streams. Below the falls the river runs in a narrow gorge of great depth. Farther up, the Paraná is joined by the Iguassú River. Six miles above the meeting place of these two streams is one of the most beautiful falls in the world, the falls of Iguassú, the Indian name for "Great River." The water rushes over a cliff of ancient lava more than two hundred feet high, and the roar of the falling waters may be heard for miles.

**The Life of the Paraguayan People.** Paraguay is far from the sea and its people are so shut off from the rest of the world that we should scarcely expect them to live like the inhabitants of more fortunate places. The greater part of the people of Paraguay are Indians



Courtesy of W. D. Boyce

FIG. 99. *A Paraguayan woman smoking*

or mixed descendants of the Guarani stock. They live scattered throughout the western or lowland section of the country in little groups and villages. Each village consists of huts with thatched roofs and walls of mud or sticks and poles. The walls need not be thick, for it is never cold in Paraguay as it is in the northern part of the United States. The Par-

aguayan babies play on the mud floors of the huts and out in the sunshine often without any clothing, and men and women wear only light cotton clothes. At night those who live in huts sleep in grass hammocks hung from the roof. To a large extent the people depend upon fruits for their food, and chief among these are oranges. Another common food is the *manioc*. It is a root with a

white mealy interior that tastes somewhat like a mixture of flour and potatoes. It is not so pleasing to the taste as our potato, but the people use it quite as much as the potato is used in America.

It takes the traveler a long time to become accustomed to the general use of tobacco in Paraguay. Women, and even children and babies, learn to smoke (Fig. 99). It shocks one to see a pretty girl walking along the street puffing away at a big fat cigar as if her life depended upon it. Tobacco is one of the important products of the country. It is grown in great quantities and sold in the form of cigars or cigarettes or in great rolls of twisted leaves. It is very cheap, of rather poor quality, and some of it is almost worthless.

Besides the picking of oranges and the gathering of maté or Paraguay tea the people of Paraguay herd cattle on grassy tracts near the river. Most of the cattle are slaughtered for use in Paraguay, but in small numbers they are also shipped in river steamers to the countries of the south, where they are killed and dressed for the frozen-meat market or used as fresh beef.

The only large cities are Asunción (Fig. 98), the capital, with ninety thousand people, Villa Rica with twenty-five thousand, Concepción with fifteen thousand, and Villa del Pilar with ten thousand, and these are very small as most cities go. Indeed, except for Asunción they are mere villages of very poor people. Even in the capital there are few well-kept houses or offices. The greater part of the city consists of thatched, mud-walled cabins. They have a squalid appearance relieved only by the smooth curve of the river bank and the wooded hillslopes overlooking the city.

## CHAPTER XI

### URUGUAY: THE SMALLEST COUNTRY IN SOUTH AMERICA

**The Sparse Population of South America.** It is one of the odd features of some of the South American republics that they should have such a small number of people. Ecuador and Bolivia are alike in this respect, and even more conspicuous are the republics of Paraguay and Uruguay. In the United States the strong and continuous westward movement of settlers from the Atlantic coast made each new group feel that it sprang from a common stock, and even if the bond at times became weak, still there was a feeling of unity that has grown with the passing of time until to-day we are a solid nation of many millions even if we are spread rather thinly over a huge territory.

Although the Spanish and the Portuguese of colonial times were very widely scattered throughout the southern continent they lived in large numbers only in the most favored localities. Now the physical geography of South America is such that these favored localities are in general separated by stretches of territory of so little value, even at present, as in general to make good natural boundaries. The Argentine has the greatest extent of good agricultural land, but the Argentine people are separated from the Pacific coast by a barren mountain range, the Andes. The valleys of coastal Peru are exceedingly fertile, but they are separated from the equally fertile coast valleys of central Chile by one of the most barren deserts in the world. The mines of Bolivia were the centers round which the white settlements of

that country first formed, but the mines of Bolivia are reached only after crossing wide expanses of upland and mountain country of little value to man.

Even in colonial times interests came to differ partly because of the differences of climate, soil, and natural resources, and partly because time increased rather than diminished the original differences between the several groups of settlers, if such we may call the adventurers, gold seekers, and missionaries that first came to South America. When the wars of emancipation began each group was eager to break away from Spain and to form a republic. Had the different groups been nearer each other, or had they sprung from a common colonizing center, they would in all probability have formed a smaller number of republics; but separated and different as they were it was natural that each should want to become a separate nation, not daring to trust its destiny with a larger group that might neglect it.

Among the smaller republics is Uruguay, with an area less than twice that of the state of New York. All the railway lines of Uruguay, if put end to end, would scarcely reach from St. Louis to Boston. The country has no navy, and the entire army numbers but five thousand men.

**A Country with Little Waste Land.** But if Uruguay is small there is at least hardly any waste land in it. Not an acre is sterile on account of climate, for the summer heat and the winter cold, in even the lowest and the highest places, do not prevent man from occupying all these regions in all seasons. To be sure some of the land is marshy and some of it is rocky, but most of it is good land that may be cultivated almost the whole year through; and, finally, there is no mountain barrier that stands between the interior and the coast, as in Brazil; hence all the land is easily reached by the settler.

A large river, partly navigable, flows along the entire western boundary of Uruguay, drains the land, and is a highway to good markets. It also prevents that quarreling with neighbors about boundary lines which might lead to war. Coal, iron, and gold are found in small quantities, but they will never become the basis of great industries. The lasting resources of the country are its grazing and agricultural lands.

**The Herds and Cowboys of the Ranches.** While a large part of Uruguay could be used for raising grain only about one sixtieth is actually so used to-day. Almost the entire energy of the country people is spent in the raising of cattle and sheep. No other republic in South America is so exclusively devoted to the grazing industry as Uruguay; in none other is the proportion of cowboys, or gauchos, so large. The land is all near the sea. Markets are therefore easy to reach at all times, and many are the herds that these favorable conditions have brought into existence. Dried-meat and frozen-meat plants are common; at Fray Bentos, Uruguay, is one of the largest meat-extract plants in the world, over four thousand beeves being killed daily. A million and three quarters of oxbides are exported every year and almost a hundred thousand bales of wool, besides horsehides, hair, tallow, and other animal products in large quantities.

It is one of the peculiar features of a grazing region that the towns are small and few in number. The people live so widely scattered that a large number of very small towns, rather than a small number of large towns, best serve the needs of the people. Until recently Uruguay illustrated this principle better than almost any other country. Among thirty-three inhabited places marked on the maps of less than half a century ago when grazing

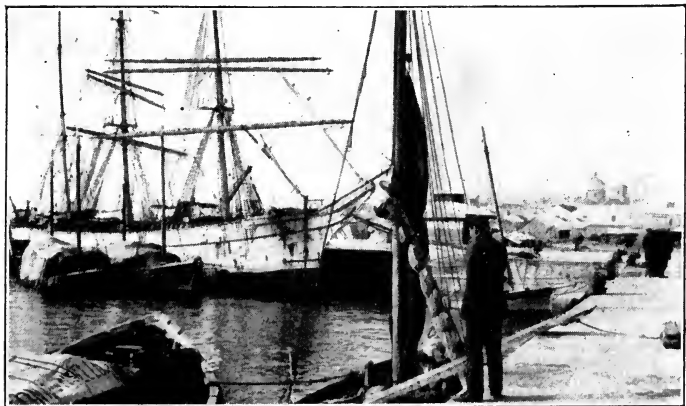


was the sole important industry of Uruguay, only six were at a greater distance than thirty miles from the coast or from the Uruguay River. When the total number had increased to ninety-six the interior towns numbered thirty-seven, but of these by far the greater number were places of little importance and probably not more than a round dozen actually deserved the name of town. Hence on leaving the capital and chief city of the country, Montevideo (Fig. 100), one plunged suddenly from the highest civilization to the semibarbarism of the Middle Ages. The capital with its handsome plazas, boulevards, and theaters was suddenly exchanged for a grassy wilderness of rolling hills, without bridges, roads, fields, groves, or gardens, and scarcely even a town worthy of the name. And instead of the people of Montevideo, with their cultivated manners and modern dress, one found the gauchos, a race of cowboys, always armed, dressed in the rudest manner, and while on the whole less wild than their Argentine cousins they were not always as careful of the law or even of human life as the more law-abiding citizens wished them to be.

But with the rapid growth of the grazing industry the land has become increasingly valuable and the ranges are not so large as they once were. Furthermore, numbers of Italian farmers have come into Uruguay recently; and farmers live in denser groups than ranchmen and cowboys, for they require less land for a living. Hence the number of towns (and especially of interior towns) has increased. Scattered all over the country, two, three, or more in each "departamento," are little towns containing from four to twenty thousand people. Some of the towns have modern improvements such as electric lights, running water, good parks, clean streets, and attractive clubs, and life in many of them is truly pleasant.

The advantages of Uruguay as a home for the farmer, no less than for the ranchman, are great indeed. In many new lands the settler must first cut down a forest and hew his home out of the wilderness before he can let in the sunlight, raise crops, and make a living. But in Uruguay there are no dense forests, only scattered clumps of trees which may be used for timber. Man need do nothing in the way of clearing the land, since cleared land is already provided for him by nature. On the grassy downs of this country he may pasture his flocks and herds without thought of shelter from the weather, and raise almost any kind of grain that grows.

**The Port of Montevideo.** Three hundred thousand people, or about one third of the population of Uruguay, live on a little point of land between the Rio de la Plata and a small bay which has become the harbor of Montevideo (Fig. 100). While there are several small ports at other places on the coast of the country none has attained much importance as compared with the capital city.



Courtesy of W. D. Boyce

FIG. 100. *Along the docks, Montevideo*

Here are gathered most of the people of means and leisure and one third of the whole population of Uruguay, all the large buildings, and the shipping, and to this point the principal railways converge from the Uruguayan plains.

Montevideo would be far more famous if it were not so near Buenos Aires on the opposite side of the La Plata estuary. Most of the general business for the interior goes to the Argentine capital. Montevideo was at first claimed by the Portuguese and later by Brazil, and has witnessed many campaigns; in fact, it has been called "New Troy" on account of the fact that it was once besieged for nearly ten years (1842-1851). While the harbor of Montevideo has been deepened to accommodate large ships it is so exposed to the strong southwest winds of winter that expensive works have been necessary to provide adequate shelter.

**The Effect of the Wars.** However favored a land may be by nature it cannot become an ideal place in which to live unless the people who settle in it are peaceful and law-abiding and put the good of the country before prejudice and quarreling. Unfortunately, the history of Uruguay is made up largely of a long record of political troubles that have stirred the country almost from the time that independence was gained. It is doubtful if the rule of old Spain would have done the country more harm than that independence which to so many has meant merely a chance to gratify personal ambition and obtain high-sounding titles or government offices with high salaries.

Several causes lie back of the political unrest of Uruguay. The early fighting against the Indians had made the settlers warlike, frequent changes of government had made them accustomed to political uncertainties, and the presence of an army tempted every ruler to stay in office through the unlawful use of military power. Political trouble

has been endless. "It began before the ink on the constitution was dry." The history of Uruguay since 1828 has been a history of repeated revolutions, factional quarrels, and a spirit of nameless unrest; it is full of disgusting details of coarse politicians trying to get control of the public purse in the name of patriotism and making the spoils of office their chief object in life.

Only within the past few years has a better political spirit been growing among the people. In 1903 the rival party to the government made its last serious effort to get control of national affairs, but the revolutionists were driven out, their leader, Aparicio Saravia, killed, and a degree of security given to the country which it has never before enjoyed in its long history. Respect for the law and the constitution is growing, the people are acquiring a broader and a better outlook on affairs, and with political peace the country will not be long in attracting industries which up to this time have been shy of such a troubled home.

To all the internal troubles must be added those due to the position of Uruguay between Brazil and the Argentine. Its geographic position makes it another Belgium. Located between two powerful and over-shadowing neighbors, each greedy for its rich farming and grazing grounds, Uruguay was claimed and indeed, for short periods, governed by first one and then the other of its neighbors. But the very presence of two powerful neighbors instead of one has preserved the integrity of the country. Each in turn, wishing to prevent its rival from acquiring this land, became the partisan of Uruguay when the other became its enemy. In 1859 a treaty was signed between the Argentine and Brazil that prevented both from interfering with the independence of Uruguay when hostilities between the big rivals were in progress.

## CHAPTER XII

### BRAZIL: THE COUNTRY OF MANY INTERESTS

**A Big Country with Varied Interests.** Brazil has often been called the land of coffee, and indeed this is the chief product of the country (Fig. 101); but also within the borders of Brazil is the land of rubber—the Amazon Basin. Were one to visit the interior uplands of southern Brazil one would find there neither coffee nor rubber but great herds of cattle, horses, and mules grazing upon rich pastures. This section one would have to call the land of cattle. In a few districts the people are talking and thinking about neither coffee, nor rubber, nor even cattle, but minerals. They live in the land of mines.

So great are all these industries and so many people are interested in them that it would hardly be fair to call Brazil by any one of these names: it is rather the land of many lands. Other countries also have a variety of



Courtesy of the Pan-American Union

FIG. 101. *Picking coffee, Brazil. Typical plantation scene*

interests and industries, but in no other country of South America is the variety so large. Bolivia has hundreds of men interested in rubber, but Brazil has thousands. For every herd of cattle that Colombia supports, Brazil has scores; for every cargo of coffee produced in Venezuela, Brazil produces dozens. Brazil is a land not only of many interests but also of big interests.

One reason for these wide differences and for these great interests lies in the size of the country. It embraces half a continent, just as the United States occupies nearly half of North America. That is one reason why we have orange trees in Florida and spruce trees in Maine, glaciers in the mountains of Washington and deserts in Arizona, wheat fields in Dakota and cotton fields in Mississippi. We, too, live in a land of many interests, where people in large numbers are doing widely different things. We are the Brazil of North America, after a fashion, as Brazil may roughly be said to be the United States of South America.

Including Indians, Brazil has more than twenty million people, or about as many as Spain, and more than a third as many as live in the United Kingdom. No state in the United States is so large as the territory of Amazonas at the western end of the Amazon Basin, which covers seven hundred and thirty-two thousand square miles, or almost three times the area of Texas. Amazonas is so large that if all of the 1,600,000,000 people of the world, men, women, and children, were gathered within its borders, and the land evenly divided among them, each one would have a square plot one hundred and fifteen feet on a side. If one started to walk about Brazil, and walked twenty miles each day, it would take eight hundred days, or several months more than two years, to complete the trip, for it is sixteen thousand miles

along its borders, or more than halfway around the world.

A country as large as Brazil has many interests because it extends into many climates, and each kind of climate has its own particular kind of products. From north to south Brazil is more than two thousand miles long; from east to west it is more than two thousand miles wide in its widest part. These figures mean that while one end of Brazil lies near the equator, the other end lies well within the edge of the temperate zone; that though some places are near the sea, others are so far away that to reach them requires weeks of travel by the fastest means in the country; that there is room for great mountain ranges which affect the temperature and rainfall; that there are mighty rivers, many Indian tribes, many kinds of animals, trees, shrubs, and insects.



Courtesy of the Pan-American Union

FIG. 102. *Railroad bridge near Rio de Janeiro, Brazil. This railroad is one of the great pieces of engineering work in South America*

**The Little-known Xingú Valley.** Far in the interior of South America and almost in the center of that continent is the valley of the Xingú,<sup>1</sup> a river which flows northward from the central region of Brazil. It is located in the least explored part of the country and has been visited by only a few explorers at long intervals. Here we find some of the lowest tribes of Brazil. It will help us understand how vast is the great interior of the country to look at the life of these remote people, still unaffected by the civilized whites of the coastal states. In 1884 a party of Germans made a somewhat careful study of the river and the people who dwell along it. This expedition found that the Xingú and its branches are inhabited by eighteen different Indian tribes which number in all about two thousand people. The so-called "tame" Bakairi, one of the Xingú tribes, resemble the farming population in other parts of Brazil in that they are engaged in agriculture and cattle raising. These people sell their produce to the traders from the towns, and have lost all connection with their savage brothers among the other Xingú tribes.

The Yurunas have had a great deal of intercourse with the people of Brazil and as a result they are the most civilized of the Xingú tribes. Their commerce with the whites consists chiefly in the exchange of their strong canoes—hollowed from the single trunks of great trees—for tools and beads. Their small huts are built on little rocky islands in midstream, generally near a fall or a rapid. In this location they have a natural defense against their old and bitter enemies, the marauding Carajas, who roam through the woods and along the streams of all the country between the two principal rivers, the Xingú and the Tocantíns. They are

<sup>1</sup>Pronounced shên gōō'.



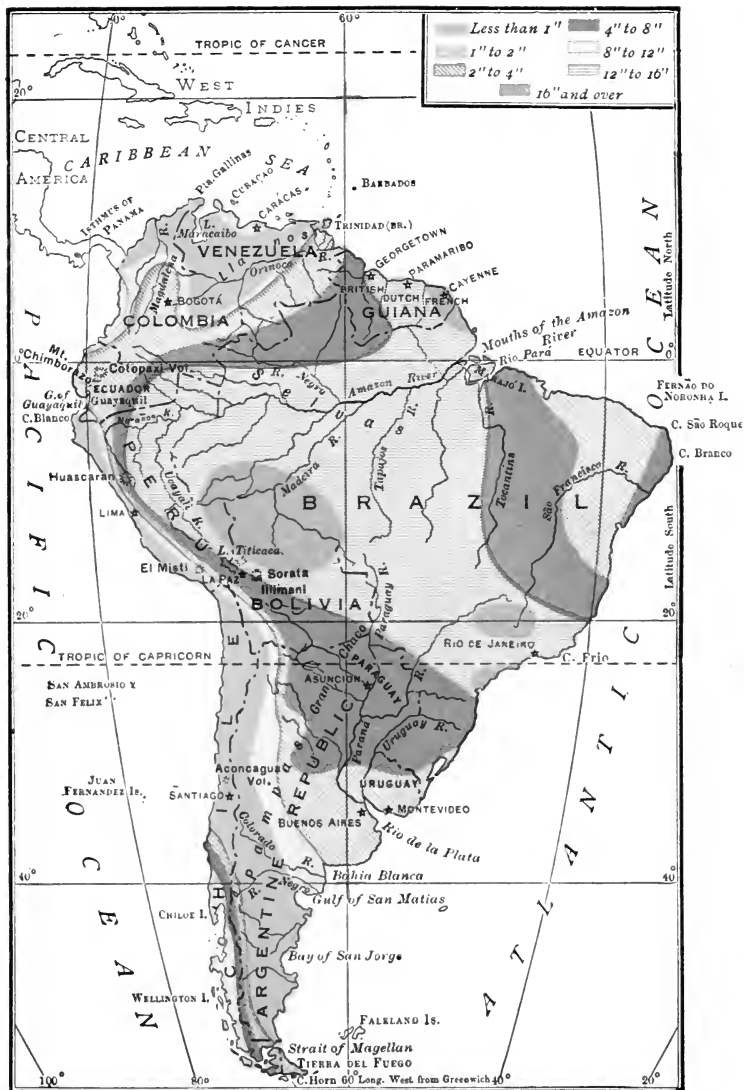
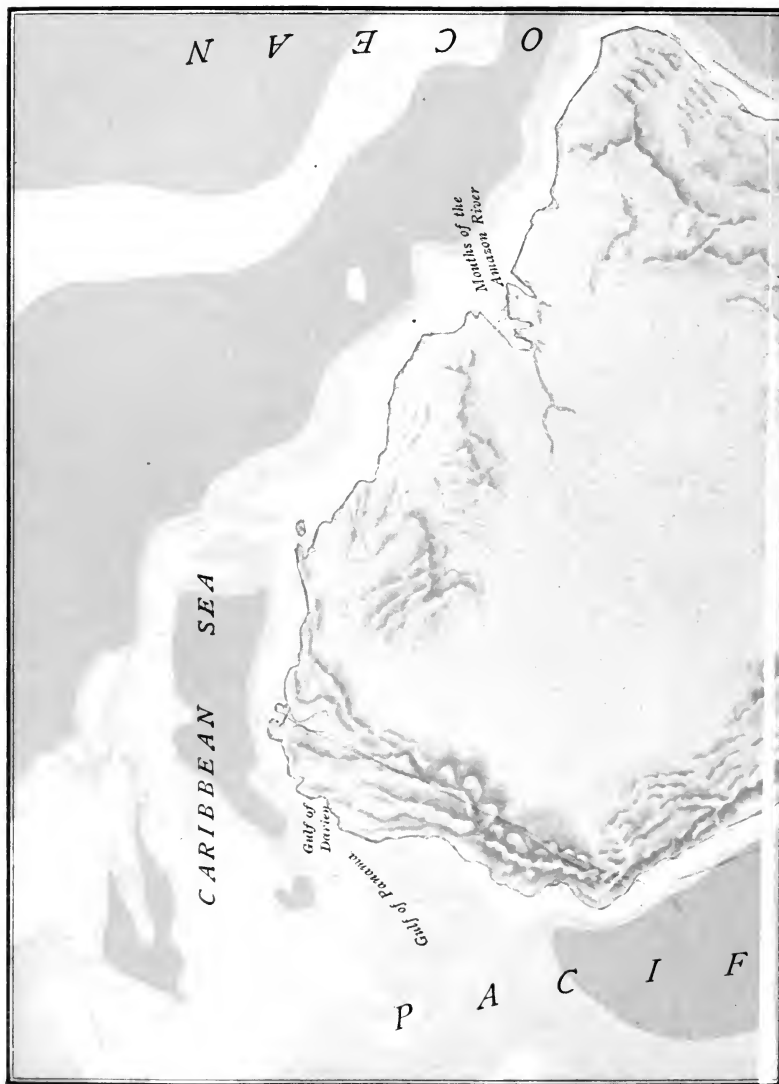


PLATE VII. Mean January rainfall





**SOUTH AMERICA**  
(RELIEF)

SCALE, 700 Miles - 1 Inch



Copyright, 1915, by Rand McNally & Co.

PLATE VIII. A relief map of South America



PLATE IX. Mean July rainfall

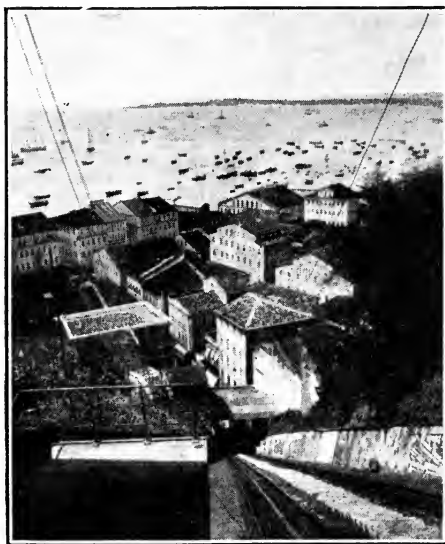
accustomed to the river from childhood, because of the places where they build their homes; hence they make excellent pilots. In their stout canoes they are able to navigate even dangerous rivers at great speed.

In the region of dense forests and barren uplands along the upper waters of the Xingú the use of metal is entirely unknown; the tribes still live in the stone age of culture. The forest trees are felled with stone axes and a clearing is made for their small plantations. Stone drills are used in perforating their shell ornaments, and for knives they use the sharp teeth of the *piranha*, a river fish. Domestic animals are entirely unknown except pet parrots and a few other birds. They are ignorant of the banana in all its varieties, also of sugar cane and rice. The world of their religion is limited to the upper waters of the Xingú and the Tapajos. They have no idea of God, but believe in a soul that goes wandering about during sleep and after death. At least one tribe has been living so much apart from all the rest that it has developed a language quite unlike that of any other in South America, although at one time it must have had a speech like that of some parent tribe from which it came.

**The White Population in Brazil.** Although the Portuguese were the original owners of the country—a prince of Portugal was the first king of the short-lived Brazilian empire—and although descendants of Portuguese are to-day the ruling class, it is surprising to learn that there are only a few million of them in all Brazil. There are also one and a half million Italians and a quarter of a million Germans, besides considerable numbers of Spaniards, Turks, Russians, French, Austrians, and others.

To-day one finds also a large number of blacks in Brazil; there are towns in which they form two thirds of

the whole population. Bahia (Figs. 103 and 104) has often been called the city of blacks. There is no color line as we know it in the United States to-day. Whites and blacks mingle as freely as the whites. Perhaps one good reason for this is the fact that out of a total popula-



Courtesy of Hiram Bingham

FIG. 103. *Looking across the bay from the port of Bahia, Brazil*

tion of more than twenty million people there are but six millions of white blood.

**The Winds and Mountains of Brazil.** Since climate—the immediate cause of the different interests of Brazil—depends so much upon wind systems and relief it will be well to see what are the climatic effects produced by the mountains and winds of the

country. We already know that the Amazon Basin is exceedingly flat. We need also to know that the Amazon Basin includes roughly the northern half of the country. The southern half is not low like the Amazon valley but stands several thousand feet above the sea and has many small and some large irregularities; it is a great plateau with a number of mountain ranges extending across it. The mountains are highest near the sea, and form a coastal fringe that walls off the interior from the strip of lowland

on the coast (Plate VIII). Their different portions bear different names—Serra do Mar, Serra da Mantiqueira, and others,—but for our purpose let us call them the coast ranges. All the way from Cape São Roque at the easternmost point of Brazil to the southern end of the country, these mountains furnish a picturesque background to the coastal lands (Plate II).

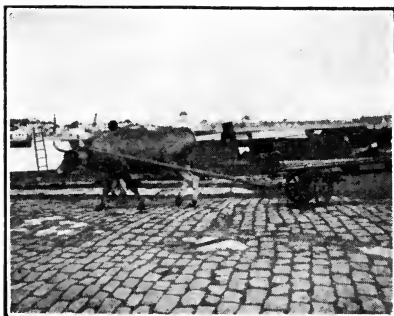
The winds of eastern and southeastern Brazil are the so-called *southeast trades* that blow the year round. They strike the coast of Brazil squarely after traversing the ocean, and a large part of the moisture which they carry is thus deposited on the seaward slopes of the coastal mountains, where it falls as rain. Since the trades blow constantly the seaward slopes of the mountains have almost daily rains; but since the winds blow with greater velocity and constancy at some seasons than at others there is more rain at one time than at another. The rainy season lasts through the southern summer (our winter); during the rest of the year there is some rain (Plates I, VII, and IX), but it falls in moderate amounts.



Courtesy of the Pan-American Union

FIG. 104. *Bahia, one of the coastal cities of Brazil*

**The Seasons of Rain.** Important differences in the time at which the rainy season occurs are brought about by the fact that the trade-wind belt is not fixed from one year's end to the other. It migrates north and south with the sun, sometimes by great and again by



Courtesy of Hiram Bingham

FIG. 105. *Ox cart in Pernambuco, Brazil*

small distances. This change in the position of the trade-wind belt affects the force of the winds and the amount of the rainfall as well as the time during which the greatest amount falls. The rainy season does not therefore always occur at all places throughout Brazil at the same

time. At Rio de Janeiro the rains fall chiefly from November to March; at Pernambuco (Figs. 105, 106, 107) they fall from April to June; and on the Amazon lands from December to May (Plates VII and IX). It is interesting to know that the southeast trades serve the purpose of man not only through the rain they bring to the useful plants which man cultivates but also by the aid they give to navigation. In the interior they enable sailing vessels and canoes on the Amazon to drive before the wind up to the head of navigation. Since the trade winds blow more strongly by day than by night, those going up river in canoes or sailboats travel chiefly by day, when the wind helps them along; those going downstream often travel by night, since the wind does not then offset the current.

Though there are well-marked dry and wet seasons there are also sharp differences in each season between the



rainfalls of successive days. A moderate rainfall may change to a violent downpour lasting for weeks at a time. At long intervals tropical hurricanes may strike the coast, as at Rio in 1817, when ships were torn from their anchors and hundreds of lives were lost.

**The Droughts of Ceará.** One of the most interesting facts about the rainfall of Brazil is the way in which the mountains shield certain places from rain. One such region in the rain shadow of the mountains is the deep valley of the São Francisco, where the dryness is extreme. The plants look much like those of the Sahara, with thick leathery leaves capable of withstanding long droughts. Another belt of light rainfall occurs northwest of Cape São Roque, where the general northwest direction of the coast happens to correspond with the course of the



Courtesy of Hiram Bingham

FIG. 106. *Shipping at the port of Pernambuco, Brazil*

southeast trades. The winds therefore do not blow across the mountains, as they do farther south, but in the same direction. Thus they give up but little of their moisture and the country is, on the whole, very dry.

At times the dryness of the region northwest of Cape São Roque is extreme and the people actually suffer. Such was the case in the state of Ceará at the close of the eighteenth century, when for four years there was very little rain. The vegetation dried up, springs and streams ceased to flow, the dry ground cracked open, and the live stock died, for there were then no plants to eat and no water to drink. Many people left the region and went to more favored places; those who stayed were brought to the verge of starvation. Such periods of extreme dryness are bound to return—indeed, less extreme droughts occur every few years—and make the land far less safe than that south of the cape. The government is therefore building dams and canals for water storage and irrigation. When completed its projects will enable the people to avoid the extreme effects of the recurrent droughts.



Courtesy of Hiram Bingham

FIG. 107. *Inner harbor at Pernambuco, Brazil*

**The Dry Grasslands of the Plateau.** Much more important than the dry coast north of Cape São Roque are the semi-dry tracts of the great interior plateau that constitutes almost a quarter of Brazil. The highest mountains and the greatest rainfall are on the coast near Rio de Janeiro. It is therefore easy to understand that there cannot be very much left for the interior. The moderate rains that fall upon the interior plateau support a growth of vegetation different from that of any other part of Brazil. It is a mixture of grass and shrubbery; one traveler says that it looks like an old English orchard. This is the grassland of southern Brazil, the land of cattle (Plates I and XI).

**The Hot and the Cool Places.** The southeastern shore of Brazil is constantly fanned by the southeast trades and here, therefore, we find the coolest places and most of the people. Down near the shore at the foot of the coast ranges, where are most of the ports and large cities, it is very hot in spite of the trade winds. It is the great heat and moisture of the low country along the shore that cause unhealthful conditions and the numerous diseases — malaria, yellow fever, rheumatism, and scrofula — which have given Brazil such a bad reputation among the people of northern lands. In spite of its nearness to the equator the interior plateau is only moderately hot throughout the greater part of the summer season, for its altitude is great enough to save it from the intense heat of either the Amazon lowlands on the north or the coastal lowlands on the south.

**The Cool Region in Southern Brazil.** In the same country in which great heat and luxuriant tropical vegetation are common, one would hardly expect to find a cool region down near the level of the sea. Ecuador, Peru, and Colombia all have extremes of heat and cold,

but for the heat it is necessary to go to the lands near the level of the sea, and for the cold to the upper slopes of the lofty volcanoes. In Brazil, on the other hand, one finds these contrasts in going, not uphill, but in sailing southward along the coast. To be sure, southern Brazil is not a land of bitter cold, but it is so cold that water freezes on the higher *campos* or plains on clear winter nights, and in the states of Santa Catharina and Rio Grande do Sul cattle have been lost in snowstorms. It is here that one finds the greatest contrasts between summer and winter temperatures and something like our succession of seasons (Plates V and VI).

In this respect the climate of southern Brazil is far different from that of the Amazon valley, where the rains are almost constant and where the heat is almost always oppressive. Even Rio de Janeiro has relatively little change of temperature from summer to winter, the difference between these two seasons being less a difference



Courtesy of the Pan-American Union

FIG. 108. *Coffee plantation, Brazil*

of temperature than one of rainfall. But in the south there are well-marked seasons differing from each other in respect to cloudiness and temperature though less as to rainfall; it is a land where winter means not only greater rainfall but also greater cold.

**A New Germany in Brazil.** Southern Brazil is unlike the rest of the country in many other respects. We find here not only a climate but also a people different from those in the Amazon valley and in the region about Rio. The national language of Brazil is not more frequently heard in southern Brazil than is Italian or German. Brazil was first owned and settled by the Portuguese, and it is Portuguese that one hears in the cities along the coast and in the capital of the country. But in the south one hears most of the people speaking German or Italian. Neudorf and Blumenau are names of farming settlements which suggest not Brazil but Germany. In fact, there are so many Germans living in southern Brazil that some people hastily conclude that Germany will some time own or claim this part of the country, or that the Germans will form a republic here, a sort of new Fatherland in South America. But the government of Brazil is on the whole good, and there is no reason why the Germans should ever form a separate state. Where the people have no real grievance a revolution cannot be supported. The Germans of Brazil, like the Germans of the United States, will probably always be citizens of the republic in which they have reared their new homes, however much their thoughts may turn to the Fatherland.

**The Campos.** We shall now turn to the interior grasslands or *campos* of Brazil in the states of Matto Grosso and Goyaz, where both climate and industries are quite unlike those of the low coastal region near Rio, or the coffee region of São Paulo (Fig. 109) or temperate

southern Brazil in the states of Paraná, Santa Catharina, and Rio Grande do Sul. Wherever we find civilized man we are sure to find his habits and customs, the way in which he wins his daily bread, and the nature of his commerce influenced largely by the kinds of plants that grow about him. Man depends upon plants for a large share of his food, and since the useful plants are of many varieties they require many different kinds of labor. Man may desire the materials that plants produce, as the latex of the rubber tree for rubber, or the fiber of the henequen for sisal hemp, or the nut of the coconut palm for food. We shall therefore wish to know first of all what kinds of plants grow in southern Brazil and then we shall be able the better to understand the life of the people who dwell there.

The rains of much of the interior plateau are light and the larger plants form open woods or shrubbery. The country is chiefly grown up to grass, and here we find the great pastures and herds of Brazil (Plate XI). The people of the far interior are therefore ranchmen and cattle owners chiefly, while those nearer the seacoast are engaged principally in the growth of coffee (Fig. 108), rice, and sugar cane.

**The Grasses of the Campos.** The grass of the campos is of many varieties, but perhaps the two most important kinds are the "goat's-beard" tufted grass and the *catinguero*; the former is of poor quality, but the latter makes excellent pasturage for cattle and horses. Where the goat's-beard grass is burnt off and the *catinguero* planted the latter is able to grow in place of the former. In some places European grasses are successfully raised, and it is almost certain that with proper care alfalfa and other forage crops could be grown to provide fodder during the dry season. In the main, the soil is good

throughout this immense area, and although in some places the rainfall is too light for agriculture without irrigation, grasses may everywhere be grown in quantities large enough to support far greater herds of cattle than one finds there to-day. The region is much better off than a great deal of the range or cattle country of our western states, where good crops and many cattle are produced by the wise use of water and by proper attention to grasses with long roots that go in search of underground water.

The government of Brazil is helping the people by experimenting with grains, grasses, and vegetables of all sorts and in this way is trying to find out just what kind of plants will do well in a particular kind of soil with a given amount of rainfall. It is interesting to know that seeds of wheat and corn are brought from the western part of the United States, where plants have become accustomed to dryness, just as we bring to the United States many kinds of grain from Asia, where plants have lived thousands of years in dry places and have learned to get along with far smaller amounts of water than those in the wet regions of Europe and the eastern part of the United States.

"The contrast between the campos (the grasslands of the interior) and the sea level conditions is remarkable. The seaward slopes of the mountains are covered with the most luxuriant vegetation. The trees are overhung with moss, creepers, and parasitic plants of all kinds. The undergrowth is a tangled mass of low shrubs, bamboos, and brakes. Palms, which are absent on the campos, are seen soon after commencing the descent. Then come banana trees, at first singly and scattering; then more and more thickly. On the lower slopes, and especially on the lowlands near sea level, sugar cane, banana

groves, guavas, and paw-paws furnish striking evidence of the change from the cooler and drier interior upland campos to the warmer and rainier seaward slopes where frost is unknown. The change in temperature and in humidity during the descent is very striking. It was significant that the freight on the campos consisted of cattle, while on the seacoast lowlands cars full of bananas were attached to the train." (*Ward.*)

**The Rice Farms of the Coast.** One of the great sources of food in Brazil that has been overlooked for many years is the rice plant. The climate and soil of Brazil are excellent for the growing of abundant crops of rice; yet until a few years ago almost all the rice used by the people was brought in from other countries, chiefly from the Cape Verde Islands, the United States, and India. It is as if we brought our wheat from Egypt instead of growing it ourselves on the prairies of Dakota, Minnesota, and other central-western states. Rice was so generally used by the people of Brazil as a cheap food that the trade in it amounted to many thousands of tons in the city of Rio alone, and about a hundred thousand tons in all Brazil. The higher government tax of later years has made the rice dearer, and the people are now eating less, and instead of importing it they are learning to grow it themselves though still at great expense.

At Moreira Cesar in the state of São Paulo a man from Louisiana is running an experimental rice farm where students are learning to grow Japanese rice with very good results. It shows how near we are to other peoples of the world to-day to learn that a man from *Louisiana* is showing some of the farmers of *Brazil* how to grow *Japanese* rice instead of importing rice grown in *India*, and brought to Brazil in *German* and *British* steamers.

Two kinds of rice are grown, an upland and a lowland



variety. The lowland rice must be irrigated as in Louisiana and is most conveniently grown in low places; the upland rice may be sown like any grain, and in the state of São Paulo large quantities of it are produced on strips of land between the coffee trees.

**The Araucaria and Paraguay Tea.** Many millions of years ago there grew on the earth strange trees for the most part quite unlike those now living. They were the ancestors of our modern trees and very few of them can now be found. One of those still living is the *araucaria*, or monkey-puzzle tree, found in southwestern Brazil and on both the eastern and western sides of the Andes Mountains of Chile and the Argentine in latitude thirty-five to forty degrees south. A relative of this tree is the *araucaria*, or monkey-puzzle plant, grown in pots indoors in northern climates. The *araucaria* forests have little undergrowth. The trees have umbrella-shaped crowns and straight trunks, valuable for lumber; and the nuts form an important article of food (Plate XI).

Another plant useful to the people of southwestern Brazil and neighboring parts of the Argentine, Uruguay, and Paraguay is the *yerba maté* or Paraguay tea, which is not at all a real tea but a kind of holly. The Indians of the region, at the time the whites first came, crushed its small dried stems and leaves, added hot water, and thus obtained a useful drink. The Jesuit missionaries liked Paraguay tea so much that they adopted the Indian custom of drinking it.

So important is the growing of maté as a means of livelihood for many people, and so generally is maté used by many people of South America, that we shall wish to know how the plant grows and how the leaves are cured. The maté shrub is from ten to twenty feet high. It grows naturally at an elevation about fifteen hundred

feet above the sea on the interior plateaus of the states of Paraná and Matto Grosso, and while most of it is gathered from wild shrubs it is in some places cultivated on plantations like other useful plants of the region. It is brought to the preparing factories in burlap or rawhide bags. After being thoroughly dried in ovens, it is passed through a number of screens, which separate the leaves and the stems according to sizes. The coarsest stems are used as fuel; the less coarse are sold as cheaper kinds of maté. The leaves are then sorted according to quality and crushed in machines from which the maté comes as a fine olive-green powder.

The people who drink maté are very enthusiastic about it and claim for it far more excellent qualities than tea and coffee possess. It does not make its users sleepless and nervous, as tea and coffee do when used to excess, and it is said to have certain important medicinal qualities. It is prepared for drinking much like ordinary tea and may be drunk in a cup if it is carefully strained. The commoner way, however, is to leave the half-crushed tea in the cup, and suck up the fluid through a tube called a *bombilla*. At the lower end of the tube is a strainer which keeps out the powder. A *bombilla* set is prized somewhat as the American lady prizes her tea set, and many people otherwise quite poor have beautifully made sets, the tube in some cases consisting of pure silver and the cup of carved wood adorned with silver.

Most of the maté produced in Brazil is shipped to the Argentine, but some is now also shipped to France, where the people are learning to use it. The Argentine uses seven times as much maté as coffee, and twenty-six times as much maté as tea; and the people of Chile, Uruguay, and Paraguay prefer it to ordinary tea and coffee.

**The Soil of Brazil.** Some peculiar features of Brazil

must be mentioned here to explain the limited fertility of part of its land. Among them is the absence of the earthworm. This worm helps to maintain the fertility of the ground in which it lives by constantly grinding it up and stirring the soil as well as by carrying down into the ground small leaves and the narrow blades of grass which, upon decay, enrich the soil. To some extent the lack of earthworms in the soil of Brazil is made up by the great numbers of ants that burrow deep into the ground and cover the surface with their huge homes. A further disadvantage under which the land produces plants lies in the fact that most of the cultivated soil of Brazil has no true winter season in which the land "sleeps," that is, does not produce crops. In our country the winter season is the one in which plant food, the product of chemical changes in the soil, keeps on gathering for the next season's growth; in Brazil plants are growing most or all of the year, and the soil is kept drained of its supply of plant food.

**The Coffee Region of Brazil.** Even if Brazil has forested tracts too dense for man's conquest, campos too dry for agriculture, and coastal lowlands too hot and unhealthful for man's comfort and safety, the country possesses at least one unrivaled resource: climate and soil along the border of the country where the coast is backed by mountains are among the finest in the world for the growing of coffee (Fig. 109). To this advantage we must add another—the lands that produce the best coffee are located near the sea where short railways connect the plantations with the sea. This is of the greatest importance in a tropical country like Brazil, for it may happen in such hot lands that the forests are so dense and the lands so remote from the sea that railway building is almost impossible, and though the land would produce

good crops man is unable to raise them because he cannot market his products. There is not a single railway in the

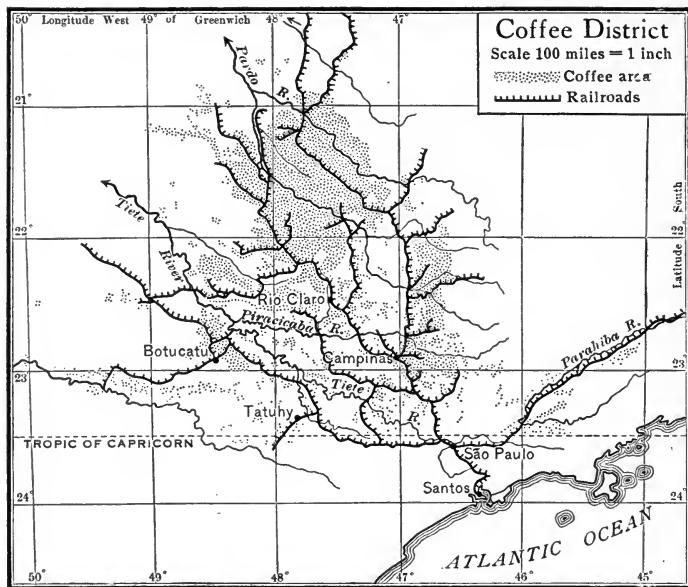


FIG. 109. *Coffee district*

After a map by R. De C. Ward

whole of the Amazon Basin except the short one recently built about the rapids of the Madeira (Fig. 136); in the Mississippi valley, also of great size, there are thousands of miles of railways. The mountain streams of Brazil are swift and unnavigable, yet it is on the slopes of the tropical mountains, and on the interior plateaus, that the best coffee is grown. Railways are required, but railways are expensive anywhere, and exceedingly expensive in tropical countries, where labor is scarce and operation costs are high (Fig. 102).

The climate and soil of Brazil are well adapted to coffee, insect pests are scarce, the extent of land capable

of growing coffee is very great, and short railways descend steeply to sea level. For these reasons Brazil has become the greatest coffee country in the world, and if one visit New York harbor and look among the incoming vessels for a coffee steamer the chances are ten to one that it has come from Brazil and that the name of a Brazilian firm will be stamped upon the sacks in which the coffee is shipped.

**The Coffee Ships of the World at the Gates of Brazil.** Many of the countries of the world send vessels to the gates of Brazil, the harbors of Rio de Janeiro and Santos (Fig. 110). Brazil may be said to levy tribute on all coffee-importing peoples. Since a large part of the coffee is shipped to the United States, we are naturally much interested in the country of its origin. The best coffee lands of Brazil are chiefly in the state of São Paulo. Almost the entire energy of the people of this state is absorbed in the raising, curing, and shipping of this



FIG. 110. *The central market of Santos, Brazil. To this artificial basin boats come with vegetables from many plantations for the people of the city of Santos*

single product. It makes one think of the cotton states of our South, where every cotton grower talks and thinks chiefly about cotton.

The plantations of São Paulo are laid out at elevations from one thousand to three thousand feet above sea level and cover thousands of square miles. No other state is so exclusively devoted to the production of the coffee berry, since none other has a climate and soil so nearly ideal. Row upon row of coffee trees stretch out in every direction; in places they seem almost like a forest. Large plantations are the rule; some are so large that they have railroad tracks running through them for the quicker delivery of the coffee crop to the central warehouses. The best berries are grown in the famous red soils, their color being due to the presence of iron—thought to be beneficial for coffee.

**Coffee Planting.** The young coffee plant requires tender care for its best growth. It will wither and die if left exposed to the hot sun, so the coffee plantations are in some cases planted to bananas, which grow quickly and shelter the coffee plant from the direct rays of the tropical sun. When the coffee bushes are large enough to take care of themselves the bananas are removed. In some plantations the coffee is planted among the original growth of trees and shrubs and when large enough to take care of itself this growth is cut away. Sometimes sticks or leaves are put over the youngest plants to protect them from the sun, or they are covered with awnings of cheap cotton cloth. In São Paulo less care need be exercised over young plants than elsewhere since the summer sun is less powerful here than in the warmer states farther north. If the plantations are kept carefully weeded, each tree will produce three or four pounds of coffee beans every year (Fig. 108).

Coffee berries in their natural state are quite unlike the coffee we see in the grocery stores of this country. The coffee beans that we know are the roasted seeds of coffee berries that grow in large clusters close to the limbs of the low coffee tree or bush and look quite like dark red cherries. Each berry contains two seeds whose flat faces are pressed close together; when dried and roasted these seeds form the coffee bean of commerce. The trees begin to blossom in December; the berries ripen and the picking begins in April or May.

**Preparing Coffee for Market.** When the coffee pickers bring berries to the factories they are doing only the first of a long series of tasks necessary to prepare the product for market. The soft pulp surrounding the berries must be removed by machines which crush the pulp but do not harm the hard berry inside. The combined mass of pulp and seeds is then passed into a cylinder with holes through which only the coffee beans pass. It reminds one very much of the screens of a stone-crushing machine, where the small particles of stone are allowed to pass through the screen but the large pieces are passed over it into a separate heap. After this the beans are washed clean in large tanks from which they come as white as snow. They must then be thoroughly dried in yards called *terreiros*, almost like fields, which are paved with cement that becomes very hot in the sun. Thorough drying takes several weeks, for if the berries are not perfectly dry they spoil on the long ocean voyages between Brazil and the ports of England, Germany, France, and the United States.

During the drying process the berries are carefully watched, stirred with wooden rakes, and covered at night to protect them from the dew or the rain (Fig. 111). In place of the drying courts a new system of steam

drying has come into use that may soon very largely take the place of the old method. By it the coffee is thoroughly



Courtesy of the Pan-American Union

FIG. 111. *Drying coffee, São Paulo, Brazil*

dried in a few hours and the long delay and uncertainty and the great cost of the old system are done away with, though the coffee is not always improved in quality.

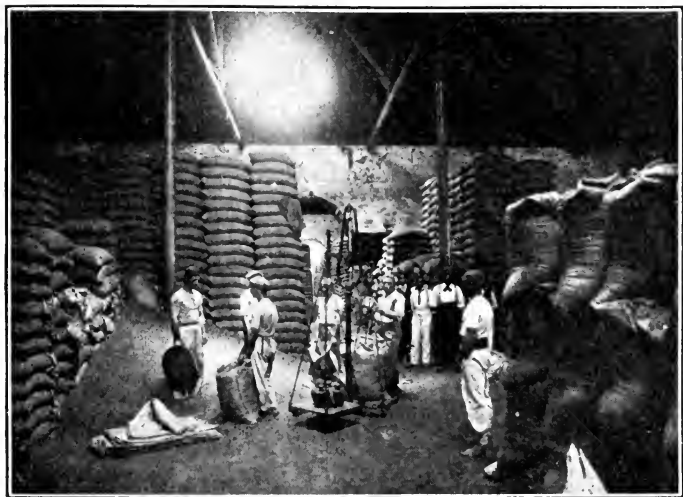
When perfectly dry the beans are placed in machines that remove the white outer skin and expose the olive-green surface of the berry that we know so well. Still another treatment must be undergone before the beans are ready for shipment. They are of different sizes, and must be sorted and graded by passing through sieves of different sizes, from which the coffee runs out in tubes and finally into bags containing one hundred and thirty-two pounds each. In this form it is ready for shipment (Figs. 112 and 113).

**The Villages of the Coffee Plantations.** So long a series of treatments and such large estates require a great many men, and in some places one finds the laborers of a single estate numbering thousands. In general,



these live in villages, and the village life of the coffee estates is quite distinct from the life of the great cities on the coast. There are large stores where laborers buy food, a bakery where they may purchase bread, a foundry, and often a sawmill where is sawed the lumber out of which their little one-story houses are built. Formerly the coffee plantations were worked by slaves, negroes brought from Africa as once they were brought into our country for the cotton and sugar plantations of the South. But, following the example of most slave-holding countries, the Brazilians in the year 1888 set all the blacks free. There were at that time about a half million slaves in Brazil, and the sudden freeing of all these people was a severe blow to both the coffee and the sugar industries.

Many of the negroes thought freedom meant that

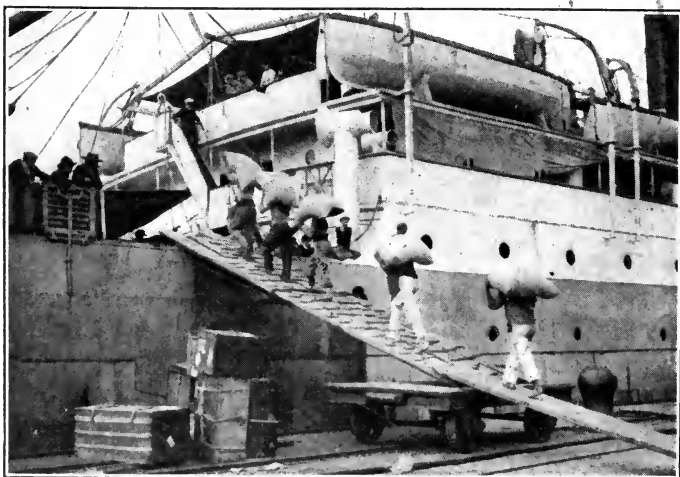


Courtesy of the Pan-American Union

FIG. 112. *Coffee warehouse, Santos, Brazil. Weighing and storing coffee in preparation for shipment abroad*

they would not have to work at all, and many of them became loafers and criminals in the large towns to which they drifted. After a time some of the negroes regarded their freedom more sensibly and went back to work on the plantations. To add to the number of laborers the government made it easy for foreigners to enter the country, and to-day one finds them in thousands on the coffee estates, where the Italians especially make excellent workmen. The negroes once slaves, or the descendants of slaves, are still too largely gathered in the towns where, as in Bahia for instance, they form a surprisingly large part of the total population. Bahia looks indeed like a city of negroes, more African than Brazilian.

**The Region of Mines.** North of Rio de Janeiro is one of the most important provinces of Brazil, for it is the center of the mining industry, "the region of mines." Its name is easy to remember for it is Minas Geraes,



Courtesy of W. D. Boyce

FIG. 113. *Loading coffee for the United States market, Santos*

which means general or universal mines. Mines of gold, silver, copper, and iron are found in it, and the product of only that part of it nearest the seacoast may be sent easily to the markets of the world, a rare thing in South America. There are a few railways in the province, but more are needed to complete the connection with the coast and enable people the better to develop the interior. While gold is now the chief product of the mines the diamond industry is quite as famous. The diamonds are, however, not nearly so valuable as those from South Africa. They are black in color and are used chiefly in diamond drills for rock boring.

The city of Diamantina is the center of the diamond and gold mining country and may be reached in two ways. One may leave the railway at Curvello and take a mule train for the three or four days' journey that separates the city from the end of the railway, or one may leave the railway at Curalinho farther north and go by coach and wagon. Either way is exceedingly difficult and shows not only how hard it is to get provisions and machinery to the city, but also with what trouble the exports are sent away. American rough-road wagons are being brought in gradually and have helped greatly in making the movement of men and goods cheaper and easier.

It is rather striking, on leaving the United States far behind, to go to the end of the railway in Minas Geraes, take a mule train to the Jequitinhonha River country, and find there American wagons. It recalls the fact that before the end of the railway in southern Peru had reached Cuzco, the old capital of the Inca empire, one could ride from the railway to Cuzco in a Cincinnati surrey. It is like going to Egypt to ride behind a Baldwin locomotive made in Philadelphia, or to Siberia to cross an iron or steel bridge made in Connecticut.

**Iron Mines and their Influence on Future Development.** Far more important than any other mineral resources of Brazil are the iron mines of Minas Geraes, where it has been estimated that there are two billion tons of iron ore. The high-grade massive hematite and the thin-bedded laminated hematite, or *jacutinga*, containing sixty-three to sixty-nine per cent iron, make up a tonnage which is probably nearly as great as the reserve of iron ore left to-day in the Lake Superior region of the United States. Some individual deposits contain several hundreds of millions of tons. As the district is only a little over three hundred miles north of Rio de Janeiro and the ore may be hauled down hill on a railway already built to Rio and another partly completed from the port of Victoria north of Rio de Janeiro, the future should see large shipments of iron ore to the United States and Europe. If large quantities of coal are ever found in Brazil, or if electric smelting becomes effective, there is no reason why Brazil should not have a great iron and steel manufacturing industry and make its own steel rails, locomotives, bridges, steel buildings, sewing machines, and ships as well as those of the Argentine and other parts of South America.

**How the Mines have Helped the Farms.** One industry often helps another, and this principle is well shown in the manner in which the mines of Minas Geraes have helped farming and grazing. The forage for mules and the provisions for men that work in the mines require considerable work on the part of people who do not mine but who depend on the farm and the ranch for a living. Some sections of Minas Geraes are like many of the settlements in Nevada where mining is an important industry. The men in the mines require food, and associated with each group of mines are people who are not

miners but who depend for a living on the supplies they sell to the miners. American agricultural machinery is being slowly introduced into Minas Geraes to better the farming conditions and supply cheaper food to the mines. The province has immense herds of cattle and mules that graze on the *campinas* or upland prairies, besides many flocks of sheep; its soil is fertile and, when properly cultivated, yields valuable crops, and its forests contain choice timber, balsams, drugs, and dyewoods.

Although Minas Geraes is most celebrated for its mines, its most valuable product is coffee; it also produces sugar, tobacco, and cotton. We must not suppose that because gold and diamonds in even large quantities are found in any region that they represent the most valuable riches of the country. The richest diamond or gold region in the world does not produce in the long run anything like the riches that are to be found in the soil.

**Vast Forests and Little Lumber.** One of the greatest of the resources of Brazil is its large and varied supply of useful woods. With the rapid increase in the past few hundred years of the civilized peoples who use wood, the forests of the north temperate zone are gradually disappearing and the supply becoming too small to satisfy the needs of the people. England imports most of the wood used in that country; Germany imports vast amounts in spite of the fact that her forests are well cared for; and even with our great forests in the United States care must be taken lest in a few years we have not enough wood to supply our rapidly increasing population.

But down in the heart of Brazil is a vast forest where man will never extensively clear the ground for agriculture, or at least will not clear it for centuries to come. Here are to be found woods of many kinds for many uses and to an increasing extent these woods are being shipped

to the people of northern countries. Mahogany is used for making furniture, for trimmings in houses and boats, and as a substitute for hard woods such as walnut, maple, and oak; many kinds of tropical cedars are now brought into northern countries for making boxes, and to some extent also in making furniture; there are also imported dyewoods and various other woods from which drugs are obtained (Plate XI).

The rich vegetable growth of tropical lands, with their abundant rains, must not lead us to suppose that lumber can be easily obtained in the Amazon valley. We hear so much about the dense tropical forests of Brazil that we may find ourselves having wrong notions about the timber and lumber resources of the region. The forests are indeed vast, and they are truly dense, but if one looks through them for a particular wood, one finds that trees of a kind do not grow in groves or over vast areas to the exclusion of all other trees, as is the case to a large extent with the trees and forests of the United States. One will find a rubber tree here and a cedar there, and beyond the cedar a tangle of vines; or only a clump of mahogany trees in one place and another clump a long way off and separated from the first clump by dense thickets of vines and bushes or by useless trees. Lumbering in a tropical forest is therefore very hard work and very expensive.

The difficulties of tropical forestry are further increased by the fact that the streams are the only highways on which the timber can be transported, and therefore lumbering can be done only on the banks of the streams or very close to them. The marshy ground does not make it possible to put the timber on wagons and haul it out to the river even if an opening be cut through the wall of vegetation. Further, when the different kinds of logs

are brought to the banks of the streams, many are so heavy that they cannot be floated to the mill like the timber in this country.

**The Name "Brazil" from a Kind of Wood.** It is a pleasing thought that the country having the greatest single expanse of tropical forest in the world should have derived its name from a kind of wood. When the news reached Portugal early in the sixteenth century that there was a great land mass to the southeast, Emanuel, the king, asked Americus Vesputius to explore the country, and gave him three vessels for the service. In the second voyage of this explorer (after whom America was named) he reached the coast of South America, anchored in a safe harbor, and for five months rested and kept up a trade with the Indians. On his return he brought to Portugal a cargo of brazilwood. This had been used as a dyewood for three hundred years before the discovery of America and was one of the precious substances brought from India by the great traders of Venice and Genoa. When it became known that brazilwood grew abundantly in the tropical forests in this part of South America, the name Brazil came gradually into use as the name of the country from which the brazilwood was obtained, and Brazil it has been ever since.

**The Wonderful Carnauba Tree.** Among the other valuable woods of Brazil perhaps the most wonderful in its general service to man is the *carnauba* tree, which grows naturally in a large territory in the eastern seacoast states. It is always green and vigorous even in times of long and severe drought. Its roots produce a medicine as good as sarsaparilla, its stem affords strong, light fibers which have a beautiful luster, and it serves also for timbers and rafters for houses and for stakes used in making fences. Wine and vinegar as well as sugar and starch are made

from parts of the tree. In those places that have periods of drought, as Ceará and Parnahyba, the poorer classes depend upon it to a great extent for food when their ordinary supply gives out. Its fruit is also used for feeding cattle. The pulp of the wood has a pleasant taste, and the milky nut is sometimes used in place of coffee. Hats, baskets, brooms, and mats are made from the straw obtained from its leaves. The straw is also used for thatching houses, and some of it is shipped to other parts of Brazil and even to Europe, where it is used in the manufacture of hats. The pith of the tree may be used as a substitute for cork; salt is extracted from it, and also an alkali used in the manufacture of common soap. Perhaps the most important use of all is the wax derived from the leaves and made into candles in common use throughout Brazil.

**The Most Beautiful City in South America.** The natural beauty of the city of Rio de Janeiro is far greater than that of all but a few of the most beautiful cities of the world. Viewed from the sea it is a Naples or a Constantinople; the islands in the harbor of Rio are like the choicest bits of the Ægean islands or the entrancing islets of the Azores; while the steep mountains that encircle the bay have all the beauty and grandeur of the Norwegian fiords combined with the lavish color and beauty of dense tropical vegetation. Nature has given the city a setting that surpasses the imagination. And in the few details in which nature might be said to be imperfect, man has changed nature and so completed the beauty of the picture and made Rio the wonder and admiration of all travelers. The wonder is the greater because we of the northern half of the earth have so poor a notion of the great cities in the southern hemisphere. We are told that more than ninety per cent of all the people of



the world live in the northern hemisphere, and from this statement we get the wrong idea that all the interesting cities are to be found in the lands north of the equator.

**The Old and the New Rio.** It is worth while to know that the city of Rio has been made more beautiful since man has adapted it to the natural beauty of the islands, the sea, and the encircling hills (Fig. 114). Twenty years ago it consisted of a more or less disjointed group of small villages thrust between the mountains on the west side of a great bay. Some of the settlements clung to the edge of the land, others ran far up along the small valleys between the hills, or upon their lower slopes. There were a few beautiful parks and buildings, and while the whole effect of the city was beautiful it lacked unity as well as adaptation to the surrounding landscape.

It was no child's play to remodel the city. Sixty million dollars had to be raised. No such change was ever made in any other city of the world, except perhaps



Courtesy of the Pan-American Union

FIG. 114. *Botafogo, Avenida Beiro Mar, Rio de Janeiro, Brazil*

when Peter the Great built Petrograd up on the frozen marshes of the Neva or when Paris was cut through and



Courtesy of the Pan-American Union

FIG. 115. *Avenida Central, Rio de Janeiro, a street widened at great expense and in harmony with the surroundings*

through by a half-dozen great avenues. The work was begun in September, 1903. First there was constructed a quay more than two miles long, following the general curve of part of the shore. Inside the quay there was built a broad avenue parallel to the shore and more than four miles long. Both quay and avenue are among the most prominent features in a general view of the city. A canal known as the Mangue was straightened and extended toward the sea and flanked by an electric-lighted avenue nearly two miles long and one hundred and thirty-one feet wide. The streets were paved with asphalt, the sewer and water-supply systems were enlarged and perfected to do away with the scourge of fever, certain hills were cut down, and there was built a great central avenue, called the Avenida Central, or Rio Branco,

more than a mile long and one hundred and eight feet wide, bordered by trees and beautiful and imposing buildings (Figs. 115 and 117). The view of the harbor and city that one may obtain from the top of the Corcovado and the Pão de Assucar (Sugar-loaf) is perhaps the most wonderful of all the celebrated views of natural wonders in the world. The tops of these two striking, steep-walled peaks may be reached, the one by rail, the other by an aërial tramway which carries one out over the forest and to the summit, from which one looks down upon the city and its beautiful suburb, Botafogo—almost as from an aëroplane or an airship (Figs. 114 and 116).

**Why Brazilians are so fond of Rio.** One can understand the pride of the people of Rio in their city when one remembers that it is by far the largest and the most beautiful city in the whole country. In spite of the fact that Brazil contains more than twenty million people it has



Courtesy of the Pan-American Union

FIG. 116. *View of Rio de Janeiro, city and harbor, Brazil. The tooth-shaped island in the bay is called the Sugar-loaf*

but six cities with a population exceeding one hundred thousand. And among these cities Rio is not only much



Courtesy of the Pan-American Union

FIG. 117. *Monroe Palace, Rio de Janeiro, Brazil. Where the third International American Conference was held*

the largest, but also the second largest in all South America, with more than a million people. It is, therefore, the second largest city in the southern hemisphere. In the three great provinces of Amazonas, Goyaz, and Matto Grosso in the great interior of Brazil, which have a combined area almost exactly half as great as the area of the United States, there are only three cities—Manáos, Goyaz, and Cuyabá—with a population exceeding ten thousand.

**The Famous Harbor at Rio.** The bay of Rio de Janeiro is one of the great scenic features of the world. It forms a bottle-shaped entrance to the city and the adjacent lands; and the largest steamers of the world find here

deep water and capacious anchorage grounds. To the left of the entrance to the famous bay are a number of fantastic hills that look strikingly like a recumbent human figure and have therefore been called "The Stone Man." The curious "Sugar-loaf" forms the feet, and the "Gaviã" the face in profile. "The bay itself presents one of the grandest prospects it is possible to imagine. Huge granitic piles, assuming the most eccentric outlines, present steep slopes which rise sheer above the surface and take on either side of the entrance the aspect of natural fortresses." (*Keane*.) Except for the narrow entrance the bay is landlocked; and it is studded with many islands and rocky crags, some of which are fortified, as are also some of the surrounding hills. No other bay in the southern hemisphere, except that at Sydney, New South Wales, is at once so beautiful and so serviceable as the bay of Rio de Janeiro.

The slopes of the mountains that inclose the bay of Rio de Janeiro are covered with a forest of tropical trees and shrubs. There is an almost endless variety of palms, long creepers festoon the giant trees, beautiful flowers and brightly colored insects supply gorgeous colors, and ferns and mosses add a touch of delicate beauty that perfects the scene.

**The Long Barrier Reef of Brazil.** Fringing the eastern shore of Brazil for several hundred miles is a long reef known as the barrier reef of Brazil. Toward the south it is composed chiefly of coral. The northern part of it is one of the unique features not only of Brazil but of South America, since it consists not of coral but of hard sandstone.

It is explained by supposing that the heavy surf once threw up a long reef of sand such as the reefs that now occur along the eastern coast of the United States from

Long Island to Texas. Back of the reef thus formed countless millions of small sea organisms lived, and their decaying bodies furnished an acid that with the salt of the sea water formed a cement. In past ages the cement hardened the sand and transformed it into sandstone. Some sections of the reef are just at the water surface, others stand some distance above, and still others are quite submerged. In places one may walk along it for miles without stepping into the water. The constant beating of the waves has broken it here and there, but on the whole the breaks occur only where rivers from the land have kept open a passage.

Within the reef and between it and the mainland there is a long strip of water as calm and peaceful as the water of the outer edge is rough. The harbor of Pernambuco (Fig. 107) is not only formed by the lagoon behind the sand reef, but it is also protected from the heavy seas by the reef itself, which in this case has been raised higher by a stone wall and thus converted into a breakwater half natural, half artificial.

We need to know one other fact about this part of the Brazilian coast to understand the harbors. The land was once higher than now; and while it stood at the higher elevation the rivers cut their valleys deep below the level of the coastal plateau which they drain. Later on the land was depressed, or drowned as geographers say; each river valley was entered by the sea and its lower course enlarged into a bay. For this reason every river has a sort of pouch-shaped lower portion, on whose shores cities have grown up and into which boats may sail.

## CHAPTER XIII

### AMAZONIA: LAND OF GREAT FORESTS AND RIVERS

**A Spanish Admiral's Opinion of the Amazon.** Over three hundred and fifty years ago, Lope de Aguirre, an admiral of Spain, made a long voyage down the Amazon and, upon reaching the coast, sent a letter to his king, Philip II, telling him about the river. So difficult had been the journey that the admiral finished his letter by saying, "God knows how we got through that great mass of water. I advise thee, O great king, never to send Spanish fleets into that cursed river." This advice is worth recalling here to show how difficult is the great Amazon, with its shifting channels and sand bars, its plague of insects, and its great heat. In all these three hundred and fifty years man has really learned little about the river except at those places where the valuable rubber tree is found. Many a village on the Amazon and its tributaries was wholly unknown until rubber was discovered in the region, and to-day remains unvisited by boats except those propelled by the paddle and the oar.

"It flows at times for hundreds of miles without passing a human habitation; or if here and there, along this desolate stretch, smoke arises to show that human beings are sheltered beneath the roof of the rude hut that barely shows itself amid the tropical green, it will come from the fire of a half savage, or of a runaway slave who has hidden himself in the fastnesses of the forest, away from his enemy, the white man. Attempts have been made to settle the river, but the Jesuits, indefatigable as they were, failed; and the people of [our] South who at the close of

the war came to Santarem, were equally unsuccessful. It remains to-day, as it has been for ages, silent and mysterious, its banks unfrequented, and its waters unknown." (*Church*, 1878.) Though this description was written long ago it is as true of a great part of the Amazon Basin now as then, and serves to bring out the fact that there are but few people in all this vast tract of alternating forest and stream (Fig. 118.)

**The Great Amazon.** The mouth of a great river is often the gateway to a great country. In the vast interior of South America one may travel for days, even weeks, across or up or down stream after stream, large and small, and find everywhere that the water is moving toward a common line, the Amazon. The entrance to this all but trackless interior is the mouth of the Amazon north of Pará. It is therefore not without reason that the people of Pará speak of the Amazon as the Mediterranean of South America. One may sail or steam up its wide mouth as up a great arm of the sea and not be



FIG. 118. *Settlement on the Amazon River. Dense tropical vegetation and heavily thatched houses*



able to make out either bank, so distant from each other are the opposite sides of the river. One might put the whole of Scotland into the mouth of this river and leave only a little piece projecting.

The Amazon discharges more water than any other river in the world. It drains an area about the size of all Europe. Its great yellow flood of waters from hundreds of sources discolours the sea for nearly a hundred miles from land. Long before the shores of Brazil are visible the blue of the tropical sea has changed into the murky brown or yellow that denotes land and the work of a great river. The depth of the river is in places one hundred and twenty feet. Its current moves at a speed of two and one-half miles an hour, and the smaller boats going upstream hug the bank to avoid it, while those going downstream sail in midchannel.

It is extremely hard to realize how flat is the Amazon channel for the last five hundred miles of its course, or from the Pas de Obispo to its mouth. In this distance the river "falls" but one eighth of an inch a mile! We are accustomed to think of the Mississippi as having a very flat course from Cairo to the Gulf, with a grade of three or four inches to the mile, but that is from twenty-four to thirty-two times as steep as the lower course of the Amazon. Two thousand miles from its mouth it is only thirty-five feet above sea level. The Amazon has the flattest river course in the world. With local exceptions, its largest tributaries, the Madeira and the Negro, continue this feature up to the base of the Andes, where one may see on the one hand lofty mountains whose summits are shrouded in clouds and on the other hand a vast flat plain about a thousand feet above the sea and yet thirty-five hundred miles distant from it by river.

Strange as it may seem, the Amazon and its tributaries

for all their flatness have rocky stretches in their courses. Five hundred miles from the Amazon's mouth are the rocks of Obispo; the islands at the mouth of the Amazon are in part rocky, and the Madeira has a line of thirteen falls and rapids (Fig. 136) in a stretch over two hundred



FIG. 119.. *A tropical forest on the banks of a tributary of the Amazon. Every year the river rises and overflows the forest for miles*

miles long! Around them a railway has been built which ends at Porto Velho and to which ocean-going ships now sail (Fig. 133). These conditions may be easily understood if we realize that the river does not have a regular but an

irregular descent. The figures we have just learned show what the average grade is; but long stretches of the river are quite flat. They are in fact great lakes connected with each other by shorter stretches with relatively steep descents.

The lake-like, flatter portions of the river have very irregular and indefinite banks, and exhibit a wilderness of land and water. So intricate and complex are the side channels that it is often exceedingly difficult to make out the main ship channel which the boat is to follow. The side channels, called *igarapes* (or "canoe paths") and *paranás*

by the Indians, run for long distances parallel to the river and intersect the tributaries so that one may go by canoe from Santarem one thousand miles up the Amazon without once entering or even sighting the main stream (Fig. 120).

When the rains are heaviest, and the water rises spreading far and wide over the country, the river becomes still more irregular in its course. The flood spreads through the forest near by, and turns large portions of the country into vast lakes (Fig. 119). When the floods subside the river's course becomes more definite. In many places a new course is formed, the old one having been partly filled with sand and mud. Altogether the river is most irregular in its behavior and very uncertain for navigation.

The main stream of the Amazon is about four thousand miles long, or six hundred miles longer than the distance from Liverpool to New York. It has fourteen large tributaries, each a great river in itself. It offers a means for inland navigation for more than twenty thousand miles. The source of the river is only sixty miles from Lima, near the Pacific coast and close to the silver mines

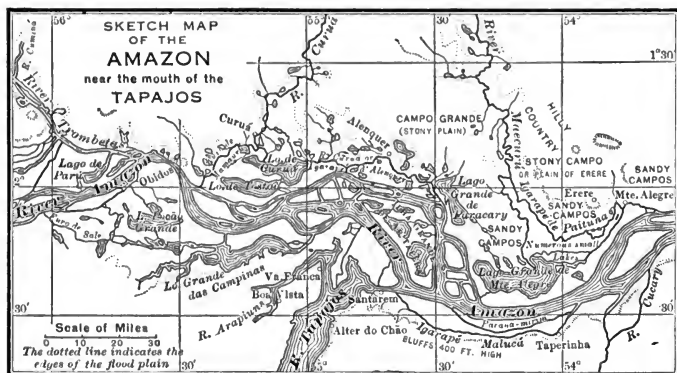


FIG. 120. *The Amazon and the Tapajós*

of Cerro de Pasco in the little lake of Lauricocha, just below the limit of perpetual winter. Thus it is seen practically to cross South America from west to east at very nearly the widest part of the continent. Its great length, and the fact that it almost crosses the con-



FIG. 121. *Canoe travel in the Amazon Basin.  
Yuracaré Indians poling  
canoe upstream*

tinent, makes it one of the greatest highways in South America. Its many tributaries drain a vast region that produces rubber, cacao, and tropical woods which would be of little use to man were it not for this great natural pathway (Figs. 119 and 121).

**The Forests of Mystery.** The heat and heavy rainfall of the Amazon valley unite to produce one of the few really

great tropical forests of the world. The density and luxuriance of the Brazilian forests pass belief. In many places the plants crowd into every space and make such a mass of vegetation that only by hewing a way through it is it possible to travel. A landing on the banks of the river is in many places impossible on account of the wall of vegetation that leans in places far out over the edge of the stream. This is the most extensive and unbroken

tropical forest in the world. One may travel for weeks, even months, and find scarcely an acre of ground that is not occupied by trees. So thickly do they stand and so completely does their foliage shut out the sun that the interior of a tropical forest is gloomy and solemn. Every plant seems to be crowding its neighbor for light and air and room in which to grow. The huge trunks of the tallest trees bear aloft a crown of leaves that reach out over the tops of all the other plants. But about the tall trunks are wound the stems of plants called parasites and epiphytes that get their food from the trees or live on them and use the tree trunks to send their crown of leaves to the top of the forest. Below, all is dark; it is toward the top of the forest that all the plants are struggling.

So dark and gloomy is the interior that it is with a



FIG. 122. *Indians and canoe on the Rio Chaparé, eastern Bolivia. The canoe is of cedar and will carry ten or twelve people. The long poles are used in shoving the canoe upstream; going downstream, the Indians use broad short-bladed paddles*

sense of relief that one comes out upon the river bank or the trail and again looks at sun and sky. It is on the side of a trail or on the bank of a stream that one sees the real beauty of the tropical forest. Here one may find masses of bushes, shrubs, and trees of every height, rising one above the other. The brilliant coloring of the flowers stands out sharply against the background of solid green and gives a charm that is lacking in the dark interior.

Yet it is a mistake to suppose that the tropical forest offers charms lovelier than those found in the forests of the temperate zone in which we live. Trees of a given kind do not stand thickly together. The spaces between the trees are so crowded with vines and underbrush that there are no beautiful woodland aisles as in our forests. There is no carpet of leaves and grass. The sunlight is nearly shut out, and one misses the dappled effect that beautifies the stately forests of pine, redwood, and beech in this country. There may be beautiful flowers in the tropical forest, but for every flaming blossom to be found there, one as beautiful may be found in our fields and pastures. Nor are there open glades where the sunlight comes in and gives light to grass and woodland flowers. Luxuriant, but overcrowded; dense, but impenetrable; decorated with blossoms along the river banks, but with a gloomy interior—these qualities of the tropical forest make the traveler glad to return to the cool and lovely woods of his northern home.

In this land of abundant vegetation and of many kinds of plants one might suppose it possible at a moment's notice to get food enough for a meal. This is by no means the case. The forest plants must be improved or new plants brought in from outside lands before man finds it possible to live here. There are fish in the rivers and

wild animals in the forest, but even the Indians require vegetable food and almost every tribe has its cultivated patches of yuca or manioc from which they wander for a limited time only; and the white man finds that cultivation of the soil is absolutely necessary for a prolonged stay in the forest. An Indian turned loose in a strange part of the forest, and without tools of any sort or bows and arrows, would have a hard time finding food enough to eat, and indeed he might actually starve in the midst of the most abundant vegetation. The reason for this is that so few plants in the tropical forest are adapted to the needs of man. The corn and the yuca, the rice and the oranges, do not grow wild or, if they do, they are not the kinds that are good for food. An opening must be cleared in the forest, the brush and the trees must be burned, useless plants kept out, and man must fight to keep useful plants that serve his needs (Figs. 122 and 123.)

**Wild Indian Tribes of the Amazon Basin.** Within the wide borders of the Amazon Basin there are a great many different tribes of Indians with varying customs and ways of getting a living. All of them are very simple, all eat plain food, and all have rude huts and a barbarous speech. All live in tribes held together by the loosest bonds—food supply and protection against unfriendly neighbors. The rivers supply a portion of their food. The land supplies a few game animals, such as the monkey, the sloth, and the wild pig or peccary, and a few vegetables which require but little cultivation.

They are all ignorant and without ambition to lift themselves above their dreary surroundings. Left to themselves they would for centuries to come, if not forever, remain in the same low state in which they were found by the earliest explorers. They have no written language and their spoken language consists of a few

hundred words only, the names of common objects, such as the animals they hunt, the food they eat, and the plains and the streams about them. Some are wholly without religion, others believe in good and bad spirits, and a good many have myths about the creation of the world and the manner in which their particular tribe came into it.

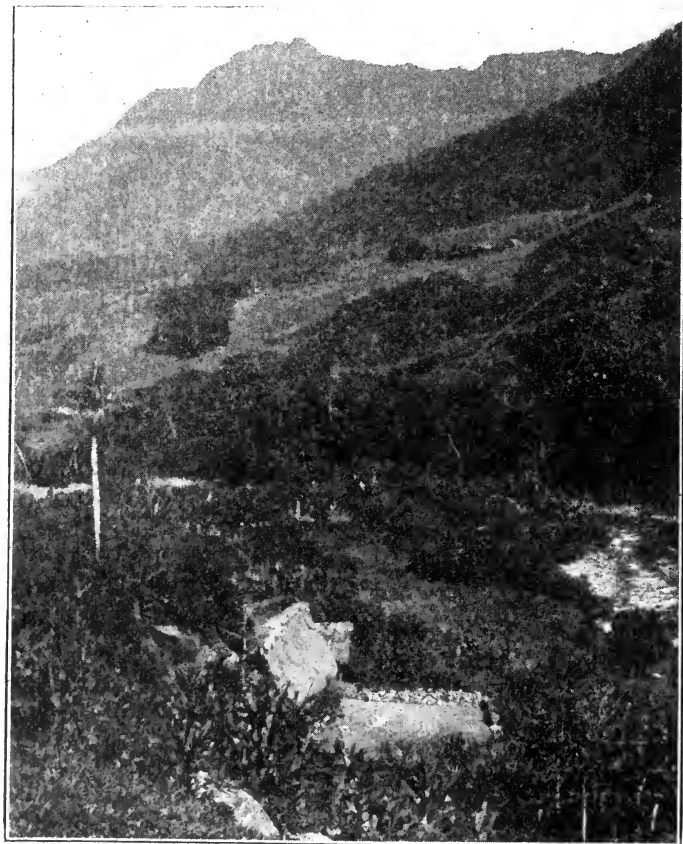


FIG. 123. *The Juntas valley, eastern slopes of the Bolivian Andes. The mountain slopes produce coca and fruit*



**The Wretched Mura Indians at Matari.** It will be interesting to look at a few of the wild tribes and see in what manner they live, where their food supply comes from, and how they differ from their neighbors. First of all we shall describe the life of a wild Indian tribe of the lower Amazon, the Mura Indians at Matari. A village consists of about twenty flimsy mud hovels on the edge of a luxuriant forest. There are no cultivated trees or plants about, and the whole appearance of the place is forlorn and poverty-stricken. The people are timid and distrustful and their appearance is not improved by the black mud with which their bodies are begrimed as a protection against mosquitoes. The children go about naked. The women wear petticoats of coarse cloth blotched with a dye, called *murixi*, that is made from the bark of a tree. Sometimes necklaces of monkey's teeth are worn.

Originally these dirty savages lived along the lower Madeira and were part of the great Caraio nation that consisted of a group of agricultural tribes of far nobler character and ways of life. But for centuries they have lived in low-lying forest areas often covered with water. The miserable land and the wretched surroundings have degraded them. Once they lived in well-made houses, had gardens, and a knowledge of weaving and pottery; now they are among the lowest tribes of the world. They have become a nation of nomadic fishermen, ignorant of agriculture and all the other industries known to the people from which they came.

They live in separate families or small groups, and wander from place to place along the banks of rivers and the shores of lakes in search of food. At each resting place they build rude huts at the edge of the stream on which they live for a short time. Their canoes were once made of the bark of a tree bound into shape by vines, but

these are now rarely seen. Their food is chiefly fish and turtles, which they shoot skillfully with bows and arrows. Fish is to these people what the seal is to the people of Greenland. Their only method of cooking is by roasting, and as a general rule their only vegetable foods are bananas and wild fruits. The filth, poverty, and deep savagery of the Muras afford a remarkable example of the effect of the swampy lands in which they maintain a miserable existence.

**The Yuracaré Indians of Eastern Bolivia.** Along the banks of the Rio Chaparé in eastern Bolivia may be found the savage Yuracaré Indians who build their huts chiefly on the banks of the rivers, creeks, and bayous that thread the low-lying lands in which they dwell. (Figs. 121 and 124). Sometimes a hut or group of huts is built some distance away from the river at the end of a narrow trail, so well concealed that it can be seen only by trained eyes. These huts are made of strong wooden posts supporting a thatched roof and generally have only one wall. Laid out under the roof and upon the beams are bows and arrows, paddles, and a few skins. In these huts the Indians sleep, and cook either in iron kettles obtained from traders or by roasting over a fire. Usually there are a few cultivated garden patches about, containing corn and yuca, the latter being a root or tuber somewhat like the yam, but with a mealy structure and almost without taste.

The food of the garden is only a part of their living, however. They hunt in the forests with bow, arrow, and knife. They are very fond of the monkey, and the wild pig or peccary. They also catch fish, of which there are many fine varieties in the streams. These they shoot with great skill, for from childhood the men have been taught the use of the bow and arrow.

A traveler once engaged several Indians and Indian boys to run his canoe, and once a day they stopped in some quiet, shallow stretch of the river to fish. Often they shot five or six in quick succession, but some of the fish were so large that they swam off with the arrow, dived and rose again, and darted this way and that, only to die at last and float on the surface. When enough fish had been caught the canoe was drawn up on the bank, a fire started, and the fish roasted. After the meal was finished the Indians took the oily pieces that were left and greased their faces, legs, and arms to prevent the mosquitoes from biting them.

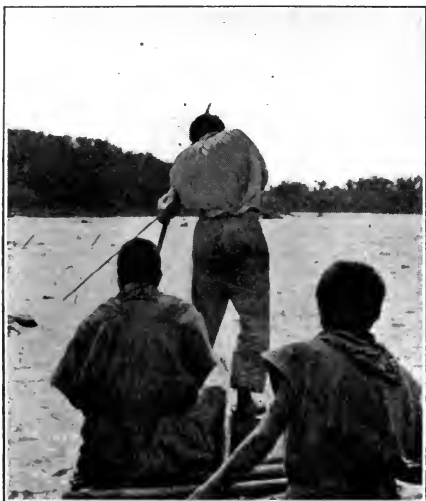


FIG. 124. *A Bolivian Indian shooting fish with bow and arrow from his canoe in the Rio Chaparé*

The Indian canoes are made of logs of cedar which are hollowed out with fire, stone, and steel. These are often of great size. Fig. 122 shows one thirty feet long and three feet wide that will hold a dozen men. The canoes are paddled by long-handled and short-bladed paddles operated with a short, jerky stroke. Going upstream against the current they use paddles only in the quieter water. Where the current is swift they tow the canoe with strands of tough bark cut from one of the forest

trees. Whenever in traveling along the river they become hungry, they run the canoe into the bank, start



FIG. 125. *The kind of house used by the valley and plains people of eastern Bolivia. It is almost all roof to protect the people from the rains that fall almost every day*

a fire, and roast some fish and yuca. The sand bars along the rivers contain many remains of such camp fires and rude shelters of bark and leaves occupied at night. These are also used by traders and other travelers, who find the sand bars dry and usually with enough sun-dried wood for a camp fire.

The Yuracarés obtain cotton cloth from passing traders, but their clothing is still made largely from the inner bark of trees which, by drying and pounding, is made into a kind of coarse-textured garment that looks like a long shirt. They are exposed to the attacks of the countless mosquitoes that swarm out of the river swamps at sunset, and their bare arms and legs are often cruelly bitten and swollen. They decorate their faces with a red ochre, daubing the paint over it in long streaks and dots. Their life seems hard and cheerless, but we must

remember that they have never known any other life than this and therefore regard their home in the same contented way in which we regard ours.

**Indian Slaves in the Rubber Forests.** Many Indian tribes of the Amazon Basin, and indeed of many other places in South America, are held by the whites in a kind of slavery. In Amazonia this is not called slavery but "peonage," though it would take a great deal of study to enable one to see any difference between the two. It is a cruel and wicked system and ought to be abolished by law. Whole tribes may be captured and taken long distances in canoes to the places where they are to be set to work in the rubber districts or on the cacao plantations. There they are given a set of tools with which to work, clothes to wear, and a shed in which to sleep. These articles are all charged against them at ridiculously high prices, and the Indian, who does not wish to buy the articles in the first place, is said to be in debt to the man who "sold" them to him, the man who is practically his owner or master. Now it is a law of the land that if an Indian is in debt to a white man he must work for him until the debt is paid. If, during the time that he is working off the debt, he tries to run away, or does not work when he is told to, he may be flogged by an officer of the town to whom the owner makes complaint. In this way an Indian is often whipped for not working to pay for something he was obliged to take.

The slave owner always sees to it that his Indian rubber gatherers never get out of debt. This he does by crediting them with very little pay for their work and charging them very much for the poor clothing, food, and tools that he supplies. If the owner of a slave wishes to sell him, he does so for the amount that the Indian is in debt to him. It is altogether a shameful practice and is

feebly excused by the men who engage in it by saying that the Indian is lazy and will not work, even if you pay him well; that there is a great deal of work to be done and the Indian is the only laborer to be found; that if rubber and cacao are produced the Indian must produce them; and if the Indian will not produce them for pay, he must be made to work even if he must be treated like a slave.

The lack of labor in the Amazon Basin is one of its chief defects. Along some of the tributaries of the Rio Negro there are rubber forests which are of great value, but in which there is a total absence of people. Foreign labor cannot be introduced because it is very expensive and few men can be persuaded to make their homes in so unhealthful a lowland. Either the rubber and cacao of the Amazon valley must in large part and for a long time to come remain untouched or a system of slavery, such as at present is found there, must be maintained. There is a third possibility, and one for which the world is waiting with great interest: we may soon discover



FIG. 126. *Santa Rosa, Bolivia, one of the eastern towns at the headwaters of a plains stream. To Santa Rosa come boatloads of rubber from the plains and caravans of merchandise from the highlands*

means for preventing those dreadful diseases that make portions of the tropics so dangerous for the white man. Malaria and yellow fever are now in part subdued, but bubonic plague, beriberi, and a few other diseases still remain frightful scourges of the Amazonian lowlands. No large number of white laborers will ever be found there unless tropical diseases are conquered and life made safer than now. The white men who go into the region to-day do so, in the main, as officials, rubber agents, adventurers, or outlaws. Rubber collecting has until recently been the most profitable occupation of the basin, and huge profits were formerly made in a short time. The competition of the rubber plantations of India and the East Indies has lowered the price of rubber to less than half its former level, and the Amazon rubber industry is rapidly losing in importance.

### **Humboldt's Dream of Great Cities on the Amazon.**

When the great explorer Humboldt visited the Amazon valley early in the nineteenth century the region was almost unknown to the civilized world and its resources were almost untouched. Humboldt dreamed of the day when there would be a large population in the valley, teeming cities, and great industries. But his dream has not been realized and will not be for many years to come, probably never, unless man finds some way to conquer tropical diseases, the weakening effects of great heat, and the torment of insects that makes life so troublesome. Until then we shall have the scattered tribes we now find there, tribes that cling to the river banks and to whom the river is the only highway from place to place, the source of part of their food, and the sole relief from the gloom of the dense forest (Figs. 125 and 126).

The people who dwell in Amazonia are not scattered broadcast over a vast area. They live as a rule in small

bands on the banks of the streams or, for the sake of protection, in isolated settlements near the river (Fig. 127).



FIG. 127. *Village on Javary River*

Along many of the rivers one may find fewer people than there are miles of stream. On some of the main rivers there are small towns and villages every few miles, and near the mouth of the Negro one comes with surprise upon Manáos—a large city in the center of a tropical forest (Fig. 128).

### **A Modern City in the Heart of the Amazon Valley.**

It was the slave raids in which the whites captured Indians for service on the plantations and rubber districts of the lower Amazon that gave rise to Manáos. The Paulistas, half-breed slave raiders from São Paulo, conducted raiding expeditions in the upper Amazon waters and built there an outpost to protect their base of operations and keep up traffic with the planters to whom they sold the kidnaped people. In this way a city grew up which was named Manáos after a now extinct Indian tribe, once the head of a great nation of Indians.

To-day the river port of Manáos is a thriving place of more than fifty thousand people, enjoying cable connection with the outside world (Figs. 128 and 129). Rubber



in large quantities is brought from far and wide. It is floated down all the rivers in launches, batelões (Fig. 130), and canoes. Here are gathered the cacao and hides, the dyewoods and the tropical woods that are shipped to the United States and to Europe. It is here, too, that the manufactured goods come which are distributed through a large part of Amazonia by the traders and rubber gatherers. With the growth in numbers of steam vessels of light draft on the tributaries of the Amazon, and with the slow increase of river population, Manáos is likely to become a much larger city than it is at present.

**The Land of Rubber.** The great business of the Amazon valley, or Amazonia as it is often called, is the gathering, the curing, and the sale of rubber. In few other places in the world can one find the people so generally engaged in the rubber industry as here. It will be worth while, therefore, to see under what conditions the rubber tree grows and how the industry is carried on. On the river plains certain kinds of rubber trees thrive on low islands and flood plains submerged for several months each year. Ground that is covered with water most of the year or ground that is never flooded is not suitable for these species. At least some of the young rubber plants seem to require shade and still



FIG. 128. *General view of the port of Manáos, Rio Negro, Amazon Basin*

air. Other species of rubber trees grow on higher ground at a distance from the river where floods never reach or



FIG. 129. *Manáos market, on the Rio Negro, Amazon Basin*

on the lower slopes of the mountains along the western border of the Amazon basin. The best rubber districts, however, are found in low country along or near the rivers (Plate XI).

The peons or slaves employed in the rubber industry are given from seventy-five to one hundred and fifty trees apiece, and these they must visit daily during the gathering season. The rubber collector uses a long knife called a *machete* to cut a path through the dense undergrowth to each tree that he wishes to tap. At times he is knee-deep in mud or up to his waist in water. As soon as he reaches a rubber tree he chips away the rough parts of the bark, so as to make a smooth place for a cup, and then with his ax cuts a small gash. Another and another is made, until there is a line of them girdling the tree. Into each gash he inserts a tin cup or with a small piece of clay fastens the cup underneath the gash in the tree. On the next day the gashes in the trees are made a little lower down and the cups are also set lower. Some

collectors tap the trees in the morning and gather the sap in the evening, while others gash the trees in the evening and gather the sap in the morning (Fig 131.) A good collector on the lower Amazon gathers about seven pounds daily; in the upper Amazon several times this amount may be collected.

The half-liquid substance that drips into the tin cups is poured into a light gourd which holds the contents of five hundred to seven hundred cups. After the drippings of several days have been gathered into a clay bowl, the rubber collector lights a fire in his hut or in the open, places a clay funnel over it, pours a thin coating of latex or "milk" over a paddle, and holds it in the smoke to thicken and "cure." As soon as this is done he again covers the paddle (with the first layer of cured sap still on it) with fresh sap and smokes or cures this in turn. When he has in this way cured a ball of sap as large as can readily be held and turned in the smoke, he slits the whole mass down the side and so releases the paddle. The fuel generally used in the curing of rubber is the



Courtesy of the Pan-American Union

FIG. 130. *Bolivian rubber unloaded from batelões for shipment by railway*

nut of the *cerbain*, a kind of palm. This is more easily gathered and carried to the places where it is used than



Courtesy of the Pan-American Union

FIG. 131. *Rubber gatherer's home on the upper Amazon River*

any other fuel, gives out a continuous dense smoke, and seems to give a better quality to the rubber than anything else that has ever been tried. The wood of certain kinds of palm trees is also employed where the nuts are difficult to collect.

After a season's crop of rubber has been gathered it is sent to the great gathering centers: San Antonio, Manáos, Pará (Fig. 134), and other river towns (Fig. 126). It is shipped in canoes, of the sort described on page 249, or in *batelões*, or steam launches. The *batelão* (Fig. 132) is a sort of barge operated with poles and paddles and able to carry from a few hundred pounds to several tons. One end of it is often covered with a sort of roof or awning of grass and poles of bamboo, as a shelter from the hot sun. The *batelões* are strongly built to withstand the

hard usage to which they are subjected on the trip to the rubber port. This is especially true of those employed on the Madeira and its branches, for a long line of falls and rapids occurs between a point above the junction of the Beni and the Mamoré and the village of Porto Velho (Figs. 133 and 136).

**The Commerce in Rubber.** In the past fifteen years rubber has become a very precious substance—one of the most important articles in the world's markets—and has been made to serve man in almost countless ways. Rubbers, coats, bicycle tires, and especially automobile tires are only a few of the many purposes for which man finds the rubber best suited. Thousands upon thousands of men are engaged in gathering it and taking it from plantation to market. Add to this the fact that half the world's rubber is produced in the Amazon Basin and one may get some idea of what rubber means to the people who live in Amazonia. We may think of every other rubber tire, every other rubber storm-proof coat,



Courtesy of the Pan-American Union

FIG. 132. *Hauling a batelão across the falls of the Madeira, Brazil*

every other overshoe that we see, as having been made out of rubber that came from the Amazon Basin,—rubber gathered by Indian peons, smoked over palm nuts, paddled down rivers that thread the tropical forests, and then taken over a long ocean route to the great ports of the world. With the recent great increase in the use and therefore in the demand and the price of rubber, the Amazon Basin has been scoured for trees that will produce it and for men to tap the trees and collect the latex.

Many formerly unheard-of villages in the depths of the vast Amazonian forest have become known because of their relation to the rubber industry, and some of them have grown to be towns of considerable size and importance. Manáos and San Antonio have long been known; but Riberalta, Iquitos (Fig. 135), Trinidad, and Acre are places that have come into prominence only within recent years. This is true of Iquitos especially. Only a few years ago it kept up a feeble trade in the upper Amazon



Courtesy of the Pan-American Union

FIG. 133. *Madeira-Mamoré Railroad and Porto Velho, Brazil*

valley by means of the paddle and the dugout canoe. Almost nothing of value was exported. It was one of



FIG. 134. *Boat landing at Pará*

the remote and unimportant villages in the heart of a vast forest. Now Iquitos is an important river port. The growth of the rubber industry has changed it completely. There is a regular monthly steamship service to Liverpool and also to New York. Almost the entire outgoing cargo of these steamships is rubber. More than half the people of the city depend upon rubber for a living. With the growth of the rubber business at Iquitos a better means of gathering it had to be found. The dugout canoes were too slow and uncertain. Steam launches were tried in their place and found to work so well that now one may find them on almost every large tributary of the Amazon. They are owned chiefly by the merchants of the town, whose "clients," to whom they loan provisions and supplies, steam away to the

rubber district in which they have bought the gathering rights, collect a load of rubber, return to Iquitos, and pay for their provisions with rubber.

The steam launch, however, has not entirely driven out the use of the canoe. There are still thousands of rubber gatherers, and many thousands more of wild Indians, to whom the canoe is the only means of going from place to place (Fig. 121). The forest is so vast, the spaces between the streams so wide, and the trails so few and so short that the rivers are still the great and almost

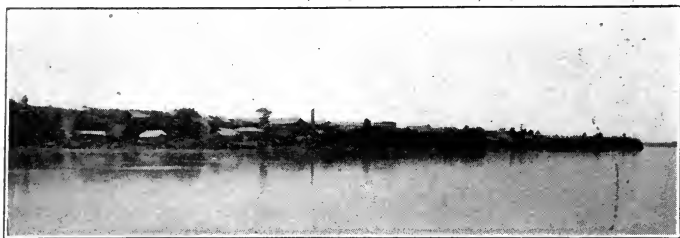


FIG. 135. *Iquitos, Peru, at head of steamer navigation on the Amazon*

the only highways. And where the launch cannot be afforded the canoe is the only means of river transport besides the *batelão*. Many rubber gatherers still use it, and almost all operate on the same system that prevails at Iquitos, getting their supplies on credit and paying for the supplies in crude rubber. Rubber is the currency, so to speak, of the Amazon valley. If a physician can be found to set a broken arm or leg, he is paid in rubber; if a man buys a boat or some rice or a mule, he pays for it in rubber. Amazonia is truly the land of rubber.

While the rubber industry has brought fortunes to many and a livelihood to thousands of others it has not been a blessing to all the men engaged in it. To the poor Indian peon or slave who must gather rubber against his will it is a curse. Likewise many a man has gone



into the great forests to buy rubber and make a fortune in a short time, and has died in the wilderness where fever overtook him. It is a business full of danger to a white man, especially to a man of bad habits. Those who lead clean and regular lives have a fair chance of outliving its dangers, but even some of the strongest and the best fail to return from the forest.

The rubber industry has also been a misfortune in those places where the people have abandoned every other kind of regular work for the uncertain business of making money out of rubber. Settlements that were once thriving have now fallen into decay. Gathering rubber was easier for the enterprising man than hoeing on a plantation. By going into the forest with a band of Indian peons enough gum could be secured in three months to give him an idle living the rest of the year. Many substances formerly shipped from Amazonia are no longer produced. Cacao, cotton, rice, and sugar were in many places produced in larger quantities before the craze for rubber began and men drifted off into the rubber districts; the wilderness again claims many a cleared place once subdued at great labor.

If the people of a region spend all their time in producing but one substance, all the other articles they use must be brought in from other places, and if these are far away the cost will be correspondingly great. Think of a region where rubber is the chief product of the people and yet where a rubber coat manufactured in Europe or the United States is so expensive a luxury that but few people can afford it! It is the same with many other articles needed here. There are no manufactures in Amazonia. All the cloth, shoes, tools, sugar, and rice are brought in to the rubber districts from foreign countries in the northern hemisphere or from distant parts of Peru,

Bolivia, and Brazil. All of them are therefore very expensive, though it must be remembered that on account of the lack of manufacturing facilities such as coal, labor, and railroads, they would be still more expensive if manufactured under present conditions in Amazonia. Salt, which is so cheap in the United States that one may often buy a barrel of it for about a dollar, sells in parts of Amazonia for thirty cents a pound, or thirty dollars a barrel. It is gathered on the vast salars of central Bolivia, taken by llama caravan to Cochabamba, and thence by mule train a week's difficult journey to Santa Rosa at the head of canoe navigation on the Rio Chaparé. Though gathered free it sells at Santa Rosa for fifteen cents a pound, for it is carried at great labor and expense. Not the original cost but the cost of carrying the goods causes the extremely high price. From Santa Rosa it is shipped in canoes and batelões down river to Trinidad, Villa Bella, Riberalta, and other river towns, where it sells for much more on account of the long and expensive river journey.

The Madeira cataracts are formed where the river crosses at right angles a number of low, narrow ridges of rock, harder than the bands of rock on either side. At one time the harder rocks gave rise to mountains but by long-continued erosion these have been reduced to mere ridges. All of the southern tributaries of the Amazon that flow northward off the uplands of southern Brazil (Plate VIII) and eastern Bolivia have similar cataracts where they cross the edges of the upland or its outlying spurs and ridges. The Canumá, the Tocantins, the Tapajos, and the Xingú are alike in this respect. These barriers are of unusual importance since in a forested region the rivers are the highways and a river with cataracts is even worse than a deeply gullied road blocked by fallen trees.

Most of the trade of the Amazon Basin centers at Pará, a city of one hundred thousand people at the mouth of the Amazon, eighty miles from the ocean (Figs. 134 and 137). The city occupies a position of importance since it is in touch with all of the great valley behind it. In the harbor are all kinds of craft from hundreds of different places. Here is an English cargo steamer loaded with rubber from Iquitos and bound for Liverpool. Yonder lies a great steamship from New York bringing a load of northern lumber, fish, hardware, clothing, salt, and oil for the people of Pará and for the rubber men along the various rivers. Some butter and fish come from Norway; rice, flour, and fish come from the United States, and sugar, coffee, and manioc from eastern Brazil.

Besides the big steamers that cross the ocean there are at Pará many kinds of boats from the different tributaries of the Amazon. Here are canoes and sailboats full of vegetables and fruit for the thousands of city dwellers; launches and side-wheel steamers from up the Amazon bringing rubber and cacao; and covered batelões from the Pará estuary and the Tocantins (Fig. 138), bringing

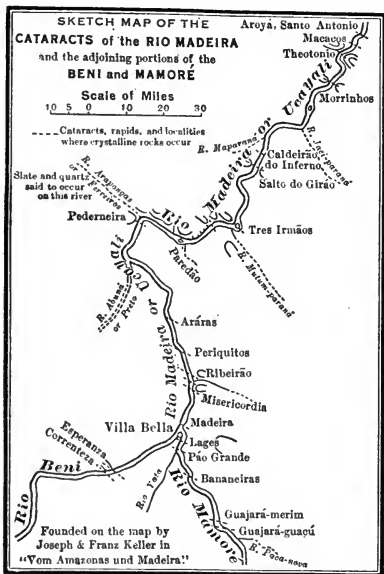


FIG. 136. *Map of falls of the Madeira*

down the tropical woods and fruits of the lower part of that valley. The people who run the boats are of many kinds,



Courtesy of the Pan-American Union

FIG. 137. *Municipal Theater, Pará, near the mouth of the Amazon*

from swarthy Indians and black negroes to sickly looking whites. It is as if the whole world had been drawn upon to make a medley of voices in many languages and a mixture of racial types.

Within the city of Pará are many curious and interesting articles of food scattered upon the floors or displayed in the shop windows. Bananas are piled everywhere and are very cheap. There is also the nutritious manioc sold as flour,—the food of large numbers of people. We are acquainted with it in another form, for it is from this substance that we get our tapioca. Quantities of black tobacco may be seen rolled up in long twists as big around as one's arm. A common food is the turtle. Many of those caught for the market are several feet across and a foot high. They have their breeding places

along the banks of the rivers and the shore (Fig. 139). The eggs are about as large as ordinary hens' eggs and have thick, leathery skins instead of shells. Each turtle lays more than a hundred, and many thousands are often found in a single breeding place. The people not only relish the turtle itself but also prize the eggs. They search the shore for them, dig them out of the sand bars in which they are buried, and make turtle oil or turtle butter out of them.

After Pará we shall leave the Amazon Basin. In spite of the heat, the disease, and the dirty natives with which the traveler has constantly to deal, Amazonia has many attractions. It is a land of mystery in spite of all the boats and the men in various parts of it. One after another the early explorers were tempted into this great wilderness to explore its forests and to penetrate its mysteries. Fable placed somewhere in its gloomy depths the mystic city of El Dorado, the city of gold, surrounded by fairy lakes and filled with gilded palaces. As men traveled along its great water courses the fabled city of gold flitted from one corner of the wilderness



FIG. 138. *Village of Tocantins, Amazon Basin*

to another and at last disappeared, though the history of the search for it will long be of absorbing interest.



FIG. 139. *Loading turtles, Amazon Basin*

One by one the secrets of the region have been discovered. Humboldt explored parts of it early in the nineteenth century, Herndon and Gibbon of the United States Navy traversed it by different routes in 1851-1852, and Louis Agassiz studied the natural history of the lower Amazon in 1865-1866. Crevaux, the Stanley of South America, penetrated some of its remotest regions. Wallace, the great naturalist, unlocked the secrets of the Rio Negro. Keller wrote of the Indian tribes of the Madeira basin and of the difficult cataracts. Colonel Church (American) and Sir Clements Markham (Englishman) crossed the basin and gave us graphic accounts of the great rivers, the plants, and the wild Indian tribes. In later years launches and steamers have multiplied on all the large tributaries as well as on the main river,

and the number of people who have visited the Amazon is now large. It no longer is a hazardous undertaking merely to cross the basin along the best routes, though to live and to work in it for years still involves risk of sickness or at least of poor health brought on by insect pests, bad food and water, and almost constant high temperature and humidity.

The latest expeditions to the Amazon country have shown how little we yet know of some of the corners of this vast wilderness. The anthropologist, Farrabee, has just explored the northeastern section—the hinterland of Guiana. Colonel Rondon of Brazil has traveled through new regions in the northern parts of Matto Grosso and Goyaz; and during 1912 Colonel Roosevelt, in company with Rondon, entered the Amazon Basin from the headwaters of the Paraguay by a new route. He discovered the course of a river, about eight hundred miles long—the so-called “River of Doubt,” since named by the Brazilian government “Rio Theodoro” in his honor. The fascinating story of his adventures is illustrated by striking photographs of forest scenes, Indian hunters, game, and strange, isolated settlements in a hitherto unknown part of South America.

## CHAPTER XIV

### ECUADOR: LAND OF VOLCANOES

**The Great Volcanoes.** As its name indicates, Ecuador is the land of the equator; it also has the distinction of containing more volcanoes for its size than any other country on the continent. The land is very irregular owing to the large amount of volcanic material poured out upon the surface everywhere and to the manner in which the volcanoes themselves are placed. Upon the central plateau there is an "avenue of volcanoes" in which are still active craters that at intervals emit mud and lava and destroy hundreds of people who dwell in the valleys at their feet.

There have been also destructive earthquakes, as in 1868, when whole towns and villages were destroyed and fifty thousand people lost their lives. If these mountains are beautiful they are also dangerous, and one cannot admire them without remembering the terrible effects of their wrath.

Cotopaxi is one of this great group of volcanoes and in 1880 was climbed for the first time by Whymper, who has written a stirring account of its active crater. "Cavernous recesses belched forth smoke, the sides of the cracks and chasms no more than halfway down shone with ruddy light, and so it continued right down to the bottom . . . [where] was a ruddy circular spot about one-tenth of the diameter of the crater, the pipe of the volcano, its channel of communication with lower regions, filled with incandescent if not molten lava, glowing and burning, with flames traveling to and fro over its surface, and scintillations scattering as from a wood fire,



lighted by tongues of flame which issued from the cracks in the surrounding slopes."

Among these giant volcanoes there is none other that lifts its head so high as lofty Chimborazo (Fig. 140). It reaches more than twenty thousand feet above the sea and on clear days may be seen from Guayaquil, a city on the hot, steaming low lands of the western coast. To travel from Guayaquil to the top of Chimborazo is to pass through as many different climates as one would experience in going from Guayaquil to the north pole, for the crater of Chimborazo is ice-capped in spite of the eternal fires that smoulder in the heart of the volcano. Within the past few hundred years Chimborazo has broken out many times.

**The Unknown Borders.** Ecuador is not only one of the smallest republics of South America; it is also the only country whose size varies so much from year to year, according to the claims of its neighbors, Colombia and Peru, that in the end it may be twice as large or only half as large as its people think it is (Plate II). As a



Courtesy of the Pan-American Union

FIG. 140. *Snow-capped mountain, Chimborazo, Ecuador, within sight of a hot lowland*

matter of fact its exact size is of small consequence, for the land it holds in dispute with these neighbors is located east of the mountains and within the hot, forest-clad basin of the Amazon, and has little present value. Some rubber is gathered on the eastern lowlands, but the amount is not large enough to cause Ecuador to take a very firm stand against her neighbors in holding the land. Like



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FIG. 141. *Old Spanish church, La Compania, Quito, Ecuador*

some other South American countries, Ecuador once in a while amuses the world by publishing a map of the country with boundaries that take in as generous slices of neighboring states as the humor of the map maker may lead him to include. If one compare an official map of Ecuador with a map of Ecuador published in Peru or Colombia, an astonishing difference will be seen.

**The White People of Ecuador.** Although Ecuador is a separate republic and has a government of its own it is almost amusing to learn how small a number of white people actually live in it and do its business. There are only as many white people in Ecuador as live in Louisville, Kentucky, that is, about two hundred and thirty thousand. Among even this number there are some who have a small amount of negro or Indian blood. Including Indians, negroes, and half-breeds there are in all Ecuador to-day perhaps a million and a half, about twice as many as live in the city of St. Louis (Plate XII).

**The Indians of Ecuador.** The Indians of Ecuador belong to two distinct groups. Upon the western plateau and in the higher valleys are the salt-eating and semi-Christian Indians who live chiefly by agriculture, are peaceful and industrious, and have a settled mode of life. Then there are the really wild tribes that eat no salt, have no religion or a very simple one, live in a savage way, recognize no man's authority, and are treacherous and warlike. These live upon the plains of the eastern part of the country, the forested western edge of the great Amazon Basin. As the forest-dwelling Indians form so large a part of the total population of Ecuador it will be worth our while to look at their customs in some detail. Their wild life makes them in some respects the most interesting of all the native people of Ecuador.

The flat, forested country of the Napo valley contains many Indian tribes. This river, one of the tributaries of the upper Amazon in Ecuador, flows through a flat country and winds back and forth in large and regular curves. Upon the outside of the river bends the banks are being cut away, while the inside of each bend is marked by a flat sand bar containing driftwood, a splendid camp site for Indian hunters, white traders, and travelers alike. For miles the country is a network of water courses, and each side of the river is bordered by a countless number of lakes opening into the main stream by sluggish channels.

The Napo country is in some places particularly wild and desolate and full of animals. The tall cane bordering the banks of the river is the hiding place of pumas, jaguars, and wild hogs that come down to the river at night to drink. On the lower Napo turtles and turtle eggs are the main articles of food, as monkeys are in the upper Napo.

**The Wild Tribes of the Napo Valley.** The Zaparo tribe of the Napo valley is one of the wild tribes, whose customs, clothing, and means of securing food are of special interest. These Indians lead a semi-nomadic life, sometimes collecting at their settlements and again following the trails of the wild animals that move now in this direction, now in that, according to the manner in which the food ripens. When they reach a place where the hunting is good they build beautiful sheds, open on all sides, with several palm-fiber hammocks slung crosswise within. These serve them only a few months at the longest, for the game soon becomes scarce as the hunters scour the forest roundabout, and abandoning the old camp site they move to a new one.

The Zaparo Indians have no industry whatever except the making of the hammocks in which they sleep and the

weaving of the fishing nets so necessary for their food supply. The only covering, worn by men and women alike, is a long bark shirt, made in a single piece, and called a *llanchama*. To make it, a moderate-sized tree of the right kind is cut down and the bark pounded with clubs until it is broken off and the interior fibrous bark loosened from the wood. This inner bark is thin and forms a good natural cloth. It is removed from the trunk of the tree without being cut so that it is in a single piece and need be only partially closed at one end, and have two armholes cut into it. Before the garment is worn it is dried in the sun and ornamented by circles and other designs in red, without which it would not be thought complete.

**The Deadly Blow-gun.** Some of the Indians of the Napo valley make the blow-gun, an instrument used by only a few tribes in the world and dreaded by all their enemies. It is as formidable to the white man with his modern high-power rifle as to the ignorant savage, for it is both deadly and silent. Not a sound may be heard to indicate whence come the deadly arrows so skillfully blown by some Indian hidden in dense brush or bamboo. The gun, about eight feet long, is made of straight bamboo. A joint of bamboo serves as a quiver; the arrow is a slender stick almost a foot long, with a very sharp point dipped in poison that soon paralyzes its victim. The end of the arrow next the mouth is wrapped with light, delicate wild cotton. In shooting the blow-gun the mouthpiece is held in both hands. It is blown with astonishing skill and has great penetration at short distances.

**An American Sewing Machine in an Indian Hut.** It is a strange and curious sight to see an almost nude Indian woman using a sewing machine in making calico dresses

for her children; yet it is a sight frequently seen in the lower parts of the Napo valley. Traders have brought in many of the white man's goods, but none that seems more strangely out of place than a sewing machine in the hut of a forest Indian. These machines are used even by those Indians who eat with their fingers and who squat upon the earthen floors of their dirty huts. The women take the greatest pride in one, usually those of a whole village purchasing a machine in common. The old Napo costume of woven grass or bark is in some places fast going out of fashion, ordinary dresses of cotton and linen being worn in their place.

**The Bleak Páramos of the Highland.** What a contrast to the life of the plains of eastern Ecuador is the life on the mountains and plateaus of western Ecuador! Here are the lofty *páramos*, or high, bleak, and almost deserted plateaus which extend northward into Colombia. The heavy mists, the clouds, and the rains of the *páramos* are so penetrating that they cause great discomfort, and it sometimes happens that both whites and Indians when overtaken by bad weather become numbed and perish. Every one attempts to get across a *páramo* as quickly as possible. There is not even a shrub, much less a human habitation, to afford food or protection. Everywhere one feels a sense of great loneliness. With the exception of the half-wild cattle one might travel for weeks without seeing any large animal. The *páramo* stag, the mountain lion, the bear, the fox, and the woolly-haired tapir live there in the scantiest numbers. A few lazy vultures and smaller birds add to the desolation. "There is a note of sadness running through the whole of nature on the *páramo*, a note so strong that even the wild inhabitants seem to have caught it. It is a desolate and melancholy land." (Keane.)

**The Wet Lowlands of the Coast.** Upon the western edge of Ecuador one finds again the rank vegetation that is the mark of tropical heat and seasonal wetness (Plate XI). It is this aspect of the country that greets the traveler who enters the Gulf of Guayaquil and sails up the broad Guayas River. The banks of the stream are crowded with trees and shrubs, and everywhere are signs of



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FIG. 142. *Gliding up into the heart of the country; natives poling boat up Babahoyo River, Ecuador*

regular rains. These rains come during the southern summer, that is, during December, January, and February. After the first rains the appearance of the country is most refreshing. Animal life is abundant, the flat savannas bordering the stream are covered with a bright green carpet of grass and shrubs, and the bushes have a rich covering of leaves and flowers. During the dry season — July and August — the plants lose their leaves in large part, and rest until the summer rains come again.

The plains bordering the largest and the only navigable stream of Ecuador are well cultivated and pleasing to the eye. "Plantation after plantation, hacienda after hacienda, extend along the main stream; every house is surrounded by the magnificent fruit trees, bananas, and palms. Now we wander for hours through the dark green cacao forests, now through low coffee bushes, again over bright green fields of rice and sugar cane, or along the steep slopes of darker tobacco fields; suddenly we find ourselves for a short stretch in dense forest, where the monkeys are chattering; then we come upon thousands of cattle and horses pasturing on the open savannas. These savannas, with their great isolated trees or clumps of bamboo grasses, twenty feet high, present a wonderful sight." (*Wolf*.)

**The Panama Hat.** It is from the moist lowlands of western Ecuador that the chief exports of the country are derived. This is the land of palms and fruits, of grazing cattle, and plantations of cacao, sugar, and rice. It is a land where there is very little manufacturing. Almost all that the country produces for export is derived from the soil. The only manufactured article is the Panama hat, and because it is so famous we shall wish to see how it is woven. It may be interesting to know in passing that the name "Panama hat" is rather misleading,



for it is not made in Panama at all but in Ecuador, Colombia, and northern Peru. Some years ago, and almost the same is still true, these hats were shipped chiefly by way of the Isthmus of Panama, and it was there that for a long time they were bought and sold. But to-day it is chiefly at Guayaquil as well as at Payta, in northern Peru, that they are brought for sale. In Ecuador Panama hats are called *Jipijapa* after the town and province in that country where it is said they were first made.

The plant that supplies the straw out of which Panama hats are made is called *planta de Toquilla*. It grows wild in the low, damp forests and is cultivated on some of the plantations. The "straw" is obtained from the young white leaves that are just beginning to open. The leaves have parallel veins and it is along these that they are split into shreds resembling straw. They are then boiled and dried in the sun. For shipment from place to place the straw is packed in bales weighing from sixty-five to ninety pounds each, which sell for thirty-five or forty cents a pound.

Many of the hats made in Ecuador are of course very plain and are worn by the poorer natives. Those shipped out of the country for sale in the United States, Europe, and southern South America are as a rule better made. The highest grades are of fine fiber and are braided with extreme care. Some of them bring the maker from one hundred to one hundred and twenty-five dollars apiece. This seems like a high price, but we must remember that the straw is fine and the weaver must work so slowly that from five to six months may be required to weave a single hat. Sometimes cigar cases or watch fobs are made on commission for a particular price agreed on before the work is begun. One such article smaller than one's hand is known to have cost five hundred dollars, and to have

required several years' time to weave. Its texture resembled that of fine cloth. In some provinces the making of hats is an important industry in which a large number of people are engaged; in Guayas five hundred to a thousand dozen are manufactured every month. Nearly a million and a quarter dollars' worth are sent to the United States every year.

**Cacao in Ecuador.** More than twenty countries of the world are engaged in the production of cacao. Of these countries the most important are Brazil, the island of São Thomé, and Ecuador (Figs. 5 and 151). In 1904 Ecuador produced five thousand tons more than its nearest competitor, Brazil, but more recently Brazil occupies first place. Whole plantations are devoted to the growth of cacao so widely used as a drink by the people of temperate lands. Plantations are bought and sold at the rate of fifty to seventy-five cents per tree. Each tree produces about one pound, a pound selling for fifteen or twenty cents in Ecuador. Cacao is unlike tea and coffee in that it can be grown in only a very narrow zone between six hundred fifty and twenty-six hundred feet above the sea, and between twenty degrees north and twenty degrees south of the equator.

**Ivory from a Plant instead of an Elephant.** If one were to visit a button factory in the United States he would find there a lot of curiously shaped nuts as hard as bone and with a brown surface, but without a shell. Break open one of the nuts and there is found within only an intensely hard white interior, out of which buttons may be made. The nut is called "vegetable ivory" and it is obtained from a limited number of countries, among them tropical Ecuador, where the gathering and sale of it takes the time of many men. It is one of the important industries of the country.

Without vegetable ivory, buttons would be either much more expensive or inferior in quality, for they would have to be made of steel, of the bone and horns of cattle slaughtered for the meat market, as indeed some buttons are now made; or they would have to be made of wood, and would not wear well; or of ivory, which would be very expensive, for it is obtained from the tusks of elephants that live



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FIG. 143. *Up-country hospitality among the natives; dinner in preparation, Riobamba, on the plateau of Ecuador*

in tropical Africa. There are many other substances beside these out of which buttons are made, though almost



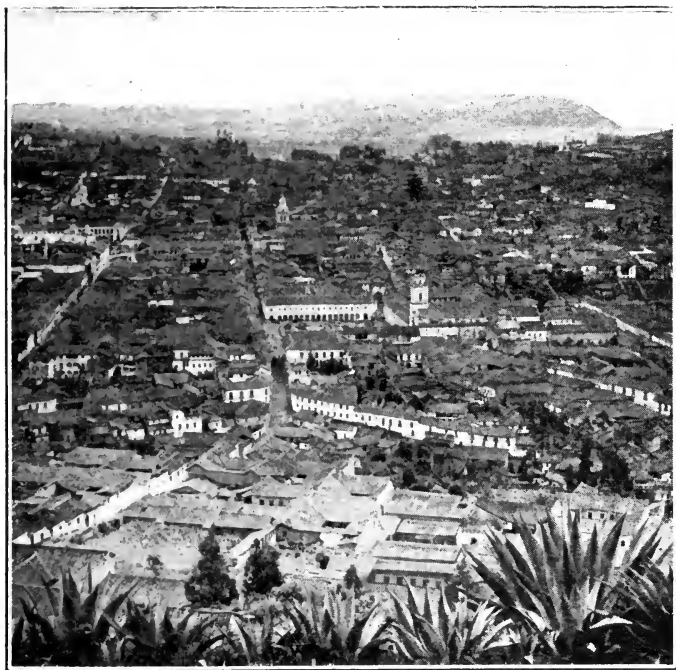
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FIG. 144. *A country housewife grinding oats for bread in a home on Ambato-Riobamba road*

all of them are open to one objection or another. But here in the land of the equator there grows a plant yielding a nut out of which excellent buttons may be made cheaply. About three million five hundred thousand pounds of vegetable ivory are sent out of Ecuador every year at a cost of more than one hundred thousand dollars. In Ecuador the vegetable ivory nuts are also shipped in some numbers to Quito, the capital city, where they are skillfully

carved into little figures that are then painted in bright colors and sold to the people of the country roundabout.

**The Plateau of Ecuador.** Between the flat, hot, moist plains of eastern Ecuador and the forested western fringe in which most of Ecuador's plantations are found, is the mountainous part of the country. Here, too, we find the high plateaus and valleys in which a great part of the natives and almost all the whites live (Figs. 143 and 144). No white man stays on the coast except to transact business, to wait for the next boat, or to see the country. A few live on the lowlands all the time, but rather from



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FIG. 145. *Quito, Ecuador, the city of the equator, 9,350 feet above the sea, among the Andean volcanoes*

necessity than from choice, because all of the lowlands and the lowland cities are extremely hot and unhealthful, and infested by flies and mosquitoes. On the other hand, the climate of the plateau is cool and healthful the year round; there are farms on which corn and cattle are produced, whose owners enjoy a degree of comfort and health quite in contrast to the discomfort endured by the fever-ridden and insect-tormented people of the plains. It is here that we realize the many kinds of climate that even such a small tropical country as Ecuador offers to its people. Upon either side are hot plains; between these are high plateaus and valleys with every kind of climate and vegetation; higher still are lofty páramos, cold, bleak, wet, and almost lifeless; and crowning the whole are superb volcanoes, whose lofty peaks rise into a land of eternal winter (Fig. 140 and Plates VIII and XI.)



Courtesy of the Pan-American Union

FIG. 146 *Street in Quito, Ecuador*

**The Cities of the Cool Plateau.** Upon the cool and pleasant plateau are the chief cities of Ecuador. Here is Quito (Figs. 145 and 146), the capital and largest city; here also are the large towns, Latacunga, Riobamba, and Ambato, each with about ten thousand people, and Cuenca in the upper Paute basin with twenty-five thousand. Quito is said to have between thirty and eighty thousand people, these wide extremes showing how carelessly the people are numbered, for no one can say just how large any one of these towns actually is. Quito stands more than nine thousand feet above the sea, under the shadow of the volcano Pichincha, and is laid out in the form of a square. Its churches (Fig 141), convents, and cathedral have a fine appearance, but are in painful contrast to the mean, squalid native houses built almost in their shadow. Here are Panama hats from the valleys on the eastern slopes of the mountains, oil paintings sold in the country districts near by, the skins of birds from the Napo valley, grain, cattle, and hides from the plateau, and a little silver and gold from the river sands.

In the quaint old city of Quito one may now see the most striking contrasts of old and new. The native Indians still follow the old ways of life: build their mud-walled houses on the old designs, use the llama to some extent, till their farms with the most simple wooden plows (Fig. 150), and live in almost every way like the Indians of four hundred years ago.

Until a few years ago Quito, although it is the capital and largest city of the entire country, was connected with the outside world only by stagecoach and mule caravan. All of its imports had to be brought in over trails and coach roads in such bad condition that they were closed for several months of the year in times of exceptionally heavy rains. Now there is a railway to Guayaquil, the

chief seaport (Figs. 147, 148, and 149), and the traveler may reach the plateau town by steamer and rail in about



Courtesy of the Pan-American Union

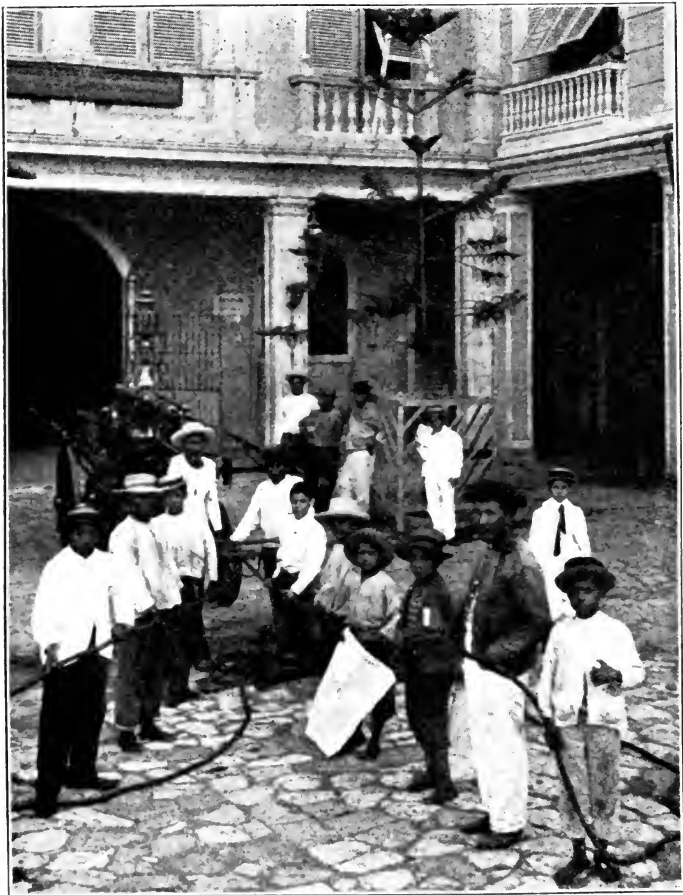
FIG. 147. *Street in Guayaquil, Ecuador. Guayaquil is one of the most unhealthful cities in the world*

twelve days from New York. The railway was built at heavy expense and at great risk. In some cases the mountain sides had to be faced with retaining walls of brick and stone, steel bridges were built across the mountain torrents that course through the bottoms of steep-sided ravines, and switchbacks were built that make the ascent of steep slopes possible. The ties are of California redwood. All timber except that used for temporary purposes had to be brought from California and Oregon.

Sooner or later the fine water power that the mountain torrents would supply will be put to use and the trains operated by electric power. The lower part of the railway had to be built by negroes brought in from tropical Jamaica because the natives from the plateau sicken and



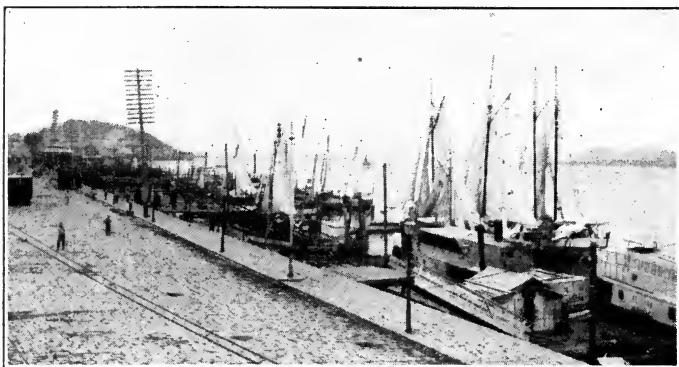
die in the unhealthy lowlands and could not be induced to work on the line until it reached an elevation of six thousand feet. The railway means a great deal not only to the people of the interior plateau but also to the valley



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FIG. 148. *Volunteer firemen ready to run with the engine, Cathedral Square, Guayaquil, Ecuador*

people on the eastern slopes of the Andes, where man has long been shut away, far from the sea and the great



Courtesy of the Pan-American Union

FIG. 149. *Guayaquil, Ecuador. Part of Malecon, showing the river front*

currents of the world's trade. The locomotives on the line now use wood obtained from near the coast and coal imported from Australia and England.

**The Only Seaport of Ecuador.** The seaport of Ecuador, to which all the goods for the interior of the country must be brought, is Guayaquil on the banks of the Guayas River. It has an evil name, not only because of the heat and flies and swarms of ferocious mosquitoes, but also because of the prevalence of disease of almost every kind. It is perhaps the most unhealthful city in the world. It lacks a decent sewer system, its streets are filthy, its air stagnant, and the heat of the sun intense. A large firm doing a great business on the west coast of South America tried for years to maintain a branch house at Guayaquil, but agent after agent died of some one of the diseases which have made the city notorious until, at last, the firm gave up in despair. Yellow fever is almost always present, varied once in a while by outbreaks of typhoid,

bubonic plague, smallpox, and malaria. From time to time the government has tried to do something, but after a feeble effort or two allowed the old condition of things to return. At last they have organized a commission and have put at the head of it Colonel Gorgas, who has made a great reputation in both Cuba and Panama for cleaning up tropical cities and stamping out disease. If the commission is allowed to carry out its plans Guayaquil may become a clean port like Rio de Janeiro and Havana (Plate II).

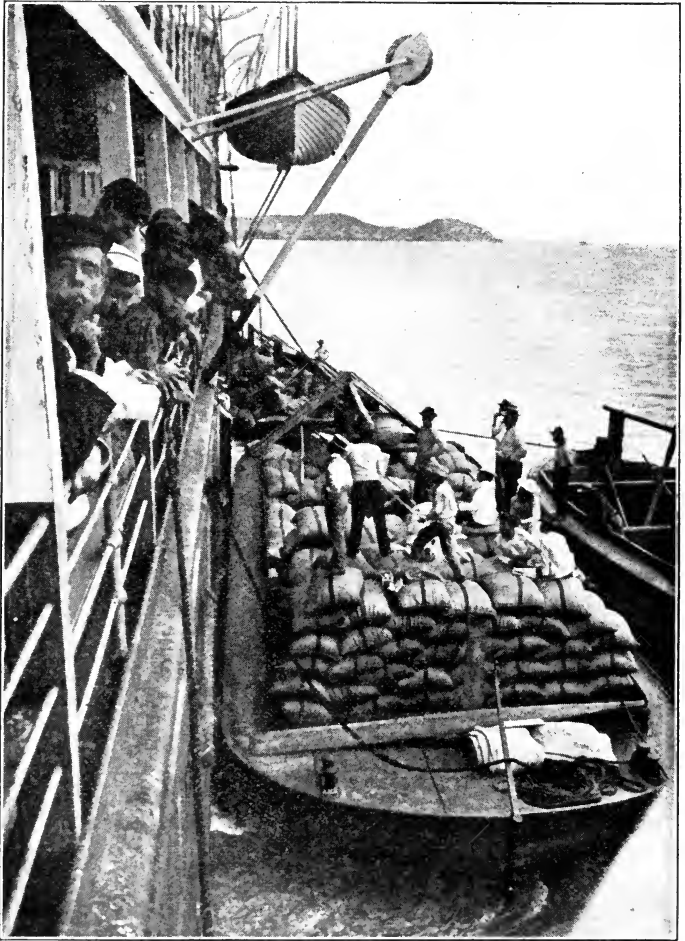
In spite of the bad climate and evil name of Guayaquil a great deal of business is done there, for it is the main seaport of the country. Although the river is shallow and full of changing sand bars, ocean steamers come well up the river, where they are met by barges, steam launches,



Courtesy of W. D. Boyce

FIG. 150. *Plowing with a crooked stick—a custom still found in both Ecuador and Peru*

dugout canoes, and rafts that move between vessel and port with the tides. Here, too, are gathered all the



Courtesy of the Pan-American Union

FIG. 151. *Loading cacao at Guayaquil, Ecuador. A typical harbor scene*

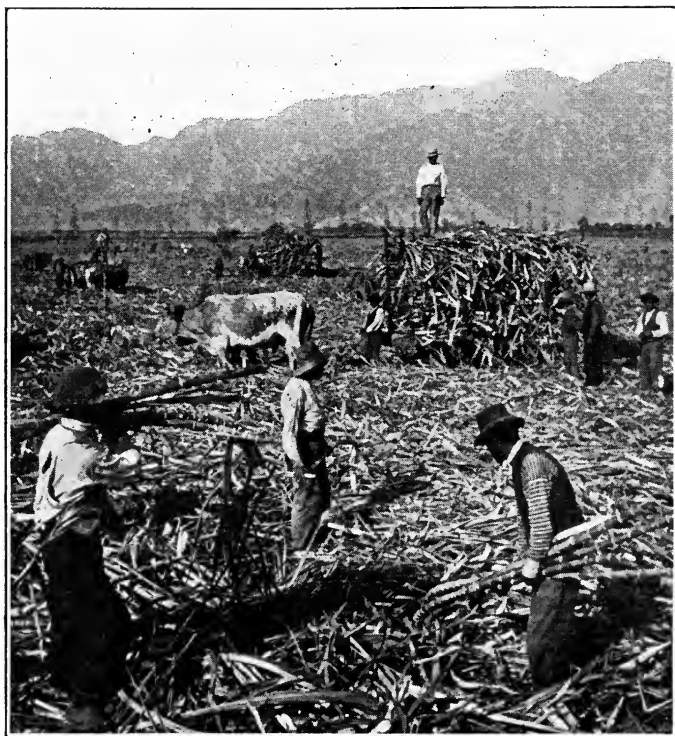
products of Ecuador, and one may learn much of the country by seeing what the great ocean steamers leave or take from it. Here are the cacao, the hides, and the cattle of the plains through which the Guayas River runs and in whose current the boats are swinging; there are the ivory nuts, the Panama hats, the sugar cane, and the rice grown on the plantations (Fig. 152) that line the river for miles. The houses of Guayaquil are made in large part of bamboo and plaster, for the sake of coolness and on account of the earthquakes for which the town is too well known. Large buildings would endanger the lives of the people, but these light structures rarely fall. Even when they do fall the danger to life is slight.

**A City on a River.** Another interesting town in Ecuador is Bodegas, many of whose houses are built far out over the water on piles driven into the mud of the river bottom. The reasons for this curious condition are the heavy rains that occur here and the fact that during the rainy season the lowlands near the river are flooded so high that the people would be driven out if they built their houses on the ground. When the rains come and the water rises the people may go into the second stories of their houses and live there until the floods subside. The street crossings are bridged by logs and the people sometimes step from one block to another in going from store to store, or even use a canoe as in the city of Venice, where canals take the place of streets and every one travels by boat.

Some of the smaller houses of Bodegas consist of one room only and are made of poles covered with palm leaves. To enter, one must go up a ladder instead of a flight of steps; the ladder can be drawn up and let down as the water rises and falls, and is not swept away as steps would be. The floors are of bamboo canes with cracks between

the separate canes—cracks so wide that one may look through to the water beneath. This is very handy for the women, because the dirt falls through the cracks to the river and it is not necessary to sweep the rooms.

The people of Bodegas, like those in other lowland towns, use charcoal for fuel, burning it in braziers, a little at a time as they require it for cooking. The rains make the poor wood even poorer, and to have a good fire good fuel must be used. Charcoal burning, as the



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FIG. 152. *Harvesting sugar cane on a great plantation, a typical scene in river valleys of Peru and Ecuador*

process of making charcoal is called, is a regular industry all the way along the west coast from Mexico past Central America and Panama to Ecuador. Farther south there are few rains and the people use the dry, resinous, quick-burning, and heat-giving desert shrubs for fuel. Charcoal sometimes sells for as much as a dollar a hundredweight and is at least one article that the native must buy and hence for which he must work at some paid task. The people of Bodegas live chiefly upon bananas, sweet potatoes, and yuca, as well as upon the sugar cane, which they eat raw. They also eat rice and dried beef obtained from the plantations and the ranches of the Guayas valley.

## CHAPTER XV

### LOWLAND AND HIGHLAND PEOPLES OF COLOMBIA

**The Caribbean and its Strange Shores.** Colombia is nearer our shores than any other South American country except Venezuela, and yet to most people it is as little known as Tierra del Fuego or Spitzbergen. From New York one may reach the coast of Colombia in a week. Starting in midwinter, the cold intense and the port of New York enshrouded with snow and ice, one reaches the Gulf Stream in three days and enters a region of summer where balmy winds whisper of strange southern lands. A few hundred miles farther is the warm Caribbean, where one sees for the first time some of the enchantments of the tropics. The sun sinks into a golden west barred by magically colored clouds, strange stars shine from an unfamiliar sky, and the brilliant moonlight gives a romantic touch to a wonderful sea. It is as if one were living again the stories of the *Arabian Nights*—as if the world were unreal. The intense and indescribable blue of the Caribbean is the wonder of all people who travel through it. By night the sea at times glows with phosphorescence; in the daytime it is brilliantly lighted by an almost vertical sun. Strange plants float upon its waters, strange fish flash through it, strange faces look from the shores of its many islands.

A week's journey through the purple and gold of the tropics, and we are in Colombia. In but a few days we have been taken from the land of the north to the land of the south, from snow and ice to heat and luxuriant vegetation. The welcome shore is bordered by waving palms; tropical fruits hang from hundreds of trees;



barefooted men and women do the tasks of the port. The southland is before us with all its mystery and its beauty, its color and abundant life, its new peoples and its tropical products (Figs. 153 and 154).

**A Large Country and a Small Map.** The republic of Colombia is so small on most maps (Plate II) that its really great size is often not appreciated until the traveler actually reaches it and begins a journey across it. Then it is with no little astonishment that he learns its vast area. Colombia is twelve times the size of the state of New York and more than twice the size of the great state of Texas. Its length exceeds the distance from Chicago to the Gulf of Mexico; its width is equal to the distance from St. Louis to New York. Its coast line is longer than our Atlantic coast from New York to Charleston, South Carolina.



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FIG. 153. *Group of native washerwomen on the Magdalena River, near Barranquilla, Colombia*

**Physical Features and Life.** If mountains are high enough they are a barrier to people; if rivers are not



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FIG. 154. *A sewing class in a school in Barranquilla, Colombia*

navigable people cannot use them in settling new places and in taking their products to market; if a country lies in the tropics where the heat at sea level is great it is important to know if there is high land where the climate is cool and white people can live with some comfort. We shall therefore look at the physical features of Colombia and see in what respects these favor man and in what respects Colombia presents obstacles to man's use of the land.

**The Plains of Colombia.** Colombia, like so many of the South American countries, shares in the vast territory of both the Amazon and the Orinoco basins. Almost one half of it lies within the region drained by these great rivers and their tributaries. What we have learned about

the forests and wild Indian tribes, the plains and products of the Amazon valley, is as true of southeastern Colombia as of Brazil, where most of the Amazon country is found. The flat river plains of eastern Colombia are the least-known parts of the country to-day. Northward and westward they are separated from the seacoast by mountains; on the east it is a month's journey to the mouth of the Amazon and the Atlantic and almost as long to the mouth of the Orinoco. For many thousands of years the mountain streams have been carrying the detritus of the high land down to the low land and accumulating it there. As a result the plains are very smooth—true river plains built up by the age-long work of the hundreds of streams that drain the eastern slopes of the lofty Andes of Colombia (Plate VIII).

Few industries of any importance are found on these river plains. The region is too far from the great routes of trade. It would cost more than they would be worth to market the hides and the mules that the grassy plains might produce. Until steamers or launches ply upon the eastern streams but little will be produced upon the bordering pastures.

To show how difficult life is upon the grasslands of eastern Colombia take the single item of salt, which most people would not think of as affecting a country's development. President Reyes, after visiting the region years ago, told his people that a cheap supply of salt is necessary to the eastern plains before they can be exploited properly. Others speak of the eager quest for salt and say that the want of it is severely felt in many places. We sometimes hear it said that a lazy man is not worth his salt—a saying that may be literally true in a country where salt is so valuable.

In the coast regions salt is made by the evaporation

of sea water that has become very salty through concentration in the lagoons where evaporation is rapid owing to the high temperature. In the interior of the country are deposits that would yield great quantities of salt if they were properly worked. One of the most noted of the interior salt mines is that at Cipaquira, about thirty miles north of Bogotá, where thousands of tons are produced annually and the deposits seem inexhaustible. But the supply of salt in the country as a whole is still very limited and a great deal of that used by the people of Colombia comes from abroad. Both the imported salt and that mined in the country is subjected to a heavy tax, one of the sources of government revenue.

Of great advantage to Colombia in the opening of her eastern plains is the boundary treaty with Brazil which was signed in 1907. It gives to each country the right to navigate the rivers running partly through one country and partly through the other. Most of the rivers of southeastern Colombia cross over into Brazil and after long journeys reach the Amazon. To ship the cattle and hides that the future herds of this region will produce, to export the rubber, and to send to other countries the tropical woods in which the eastern valleys abound, will require the free use of the waterways, since these are the only means of transportation that exist. Both nations also have agreed to improve the rivers on their common boundary.

In contrast to the vast flat spaces of southeastern Colombia are the mountains and deep valleys of the west. The Andes of Colombia consist of three nearly parallel chains running in a north-south direction, the eastern, central, and western Cordilleras. Toward the south the mountains consist largely of volcanic rock which has been


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poured out upon the surface in great amounts, in some places blocking the courses of rivers and turning them in new directions. The summits of a few of the volcanoes are so lofty that their tops are covered with perpetual snow. In northern Colombia near the shores of the Caribbean and standing so near the sea that its white summits are visible from the shore is the mountain knot called the Sierra Nevada de Santa Marta. Though it lies near the great Andean system it is separated from it by the deep Cesar valley.

In the extreme northwestern part of Colombia is still another group of mountains, the Cordillera de Chocó. These are the lowest of all the mountains of Colombia and stretch northwestward through Central America, here and there crowned by volcanoes some of which still throw out steam and lava and at long intervals overwhelm cities and plantations, killing many people, and laying waste the land.

From the loftier mountains of Colombia may be seen some of the grandest scenery which the country affords. The Cerro Munchique, in the western Cordillera, commands a view over more than fifteen thousand square miles of country. From it the Pacific coast appears to be spread out like a map. All the curves of the shore and the thousands of bays and islands may be clearly traced. Toward the east a gorgeous panorama is spread before the eye. Crowning the mountain ranges are snow-capped peaks and below them are the purple and brown mountain sides. Bands of bright-colored vegetation mark out the valleys threaded by winding rivers and interrupted here and there by foaming cascades.

**The Cold Páramos of the Mountains.** It is difficult to say which is more to be dreaded, the heat of the tropical plains east of the mountains or the cold of those higher



portions of the Colombian plateau called *páramos*. The latter are usually overhung with an intensely cold and raw mist and swept by a wind that chills the traveler to the bone. They are uninhabited save for a few scattered cattle raisers, and the occasional traveler hurries over them as quickly as he can. Many an unfortunate animal perishes here, and now and then a native caught out upon these bleak highlands has lost his life from exposure to the cold. It is between the cold *páramos* and the hot llanos that one finds the pleasant forested valleys of Colombia, with all varieties of climate and some of the most delightful views that the country affords (Plate XI).

Between the three main ranges of the Andes are the chief rivers of Colombia. The eastern and the central Andes are separated by the long valley of the Magdalena; the valley of the Cauca, the chief tributary of the Magdalena, lies between the central and the western Andes. On the eastern face of the eastern Andes are steep mountain torrents that swell the rivers of the plains, just as on the western slopes of the western Andes there are many short mountain streams that run down steep slopes to the Pacific.

Only four important streams remain, and these are at the four corners of Colombia, and for this reason will be very easy to remember. In the southeastern part of the republic is the Guaviare, draining the greater portion of the plains country; the Patia on the southwest cuts across the coast ranges or the western Cordillera, and offers a pathway from the Pacific coast to the interior valleys; between the mountains that are found in the extreme northwestern part and the northern end of the western Cordillera is the famous Atrato valley, draining toward the Caribbean Sea and making another section of Colombia available to man; while in the northeastern corner is the

Cesar valley and river, a valley rich in pasture and supporting great herds of cattle. If we remember the two central valleys of the Cauca and Magdalena and the four streams and valleys at the four corners of the country we shall be able easily to understand a great deal of the geography of Colombia, for the people of Colombia depend so much upon the valleys for food and trade that only a small number live outside them.

**The Magdalena River.** How many of us know that the Magdalena (Fig. 155) is one of the great rivers of the world, and the fourth river in size in South America? Laid out upon a map of the United States the Magdalena would reach from Philadelphia to Chicago, from New York to Florida, from San Francisco to Denver. This great river is more than a thousand miles long and drains an area larger than England, Scotland, and Wales, or about one hundred thousand square miles. What this means to the people who live in its basin can be realized only by remembering that Colombia has few railways and her rivers mean much more to her than the rivers of the United States do to us. The Magdalena drains a large part of Colombia, is navigable for hundreds of miles, and



Courtesy of Hiram Bingham

FIG. 155. *Scene on the lower Magdalena. Here the river is so stagnant that plants grow in the water as in a pond*

is joined by over five hundred tributaries from the mountains that flank its valley.



Courtesy of Hiram Bingham

FIG. 156. *Barranquilla Harbor, Colombia, where the river journey begins. A railroad ten miles long connects Barranquilla with the ocean port, Puerto, Colombia*

The upper part of the Magdalena is a steep mountain torrent and of little service to man. One hundred and seventy miles from its source it is joined by the Neiva, and here navigation in the upper Magdalena begins and continues for more than a hundred miles to the rapids of Honda. These break navigation for twenty miles and were once the cause of much expense because all goods destined for the plateau and the capital, Bogotá, had to be carried around them on muleback (Fig. 157). Now a short railway provides for the easier passage of goods and passengers from the steamer above the rapids to the steamer below them. Below the rapids of Honda there are more than three hundred miles of navigable water right down to the sea; and for the last two hundred miles the Magdalena is a broad and beautiful sheet of water (Fig. 175). Side channels branch from the main stream to join it again farther down after circling about tracts of



lowland. Along both banks are tropical swamps, some of which are flooded when the rivers are high.

The traffic of the lower Magdalena is carried on chiefly by means of stern- and side-wheel steamers (Fig. 158). During the dry season when the river is low and all steamer traffic is stopped or delayed people go down the river in *champans*, a kind of large canoe covered over at one end, and worked by a crew of fifteen to eighteen men. In addition there are rafts of bamboo which go downstream only. When they reach the port for which they are bound the logs of the rafts as well as the goods floated down upon them are sold, and the owners start back overland or return by boat for a new cargo. The river steamers carry all kinds of goods, since almost all the supplies for the cities and people of the plateau must come up the great river.



Courtesy of Hiram Bingham

FIG. 157. *Importing goods for Bogotá by pack train*

Imported coal is so expensive that the Magdalena steamers burn wood, and not only in this respect but



Courtesy of Hiram Bingham

FIG. 158. *A Magdalena River steamer. The old-fashioned stern-wheeler is still in use here, and wood is burned for fuel*

also in most others they remind one of the boats on the Mississippi sixty years ago before railways were built throughout the Mississippi lowlands. Two or three times a day the steamers run up to the bank and take on fuel. The wood is stacked in piles two or three feet across and five feet high. Clearings begun at the edge of the river gradually grow in size as the trees are removed. A few wood cutters live at each landing and inhabit a wretched hut or two (Fig. 159).

To add to the delay of the traveler the steamers find the currents and the shoals so difficult to navigate that they tie up to the bank at nightfall and wait until daylight to continue the voyage. When the water of the river is at moderate height steamers can be navigated night and day as far as La Gloria, two hundred and eighty-two miles above Barranquilla (Fig. 160). The river journey is also varied at times by the grounding of

the steamer upon some shallow sand bar, from which it is freed only by much patient labor on the part of pilot and captain.

**Indians and Negroes of the Hot Lowlands.** The swampy lowlands of the lower valley of the Magdalena have almost no people on account of the widespread floods, the unhealthful climate, the great heat, and the abundant vegetation. This vast area is without towns except at a few small river stations such as Mompos, Tenerife, and Tacaloa at the junction of the Cauca and the Magdalena. In these sweltering plains and stifling valleys the white man does not find life attractive. If he goes there it is to stay for a short time only and for purposes of business or adventure or exploration. The white man and the Indian live on the uplands; on the hot and unhealthful lowlands pure-blooded negroes are almost the only inhabitants. The few Indians that live on the lowlands



Courtesy of Hiram Bingham

FIG. 159. *One of the wood stations on the Magdalena River, Colombia, where wood cutters supply the river steamers with fuel*

are still in a state of rudest savagery. The naked tribes of the Opon territory, almost within sight from the Magdalena steamers, still roam about in the dense forests, killing birds and other animals with bow and arrow.

Upon the plains of the western slope of the country fronting the Pacific the people live much the same sort of life as in the Magdalena lowlands. Scarcely a sign of civilization greets the traveler in making a journey up the San Juan River from Buenaventura to Novita. The dugout canoes and the naked negroes in them, the palm-thatched huts built on stakes on the banks of the rivers, the blow-guns, the bows and arrows for fishing purposes, the grass ropes and bark sleeping-mats are all as simple and primitive as one could find in the depths of a Malayan jungle.

**Indians and Whites of the Highlands.** Here as elsewhere in the northern part of South America the most highly developed peoples are found not on the hot lowlands but on the cool highlands. The Indians of



Courtesy of Hiram Bingham

FIG. 160. *La Gloria on the Magdalena River*

the plateau of Colombia, in contrast to their savage brothers, lead a very advanced type of life. They have



Courtesy of W. D. Boyce

FIG. 161. *Native village, Colombia*

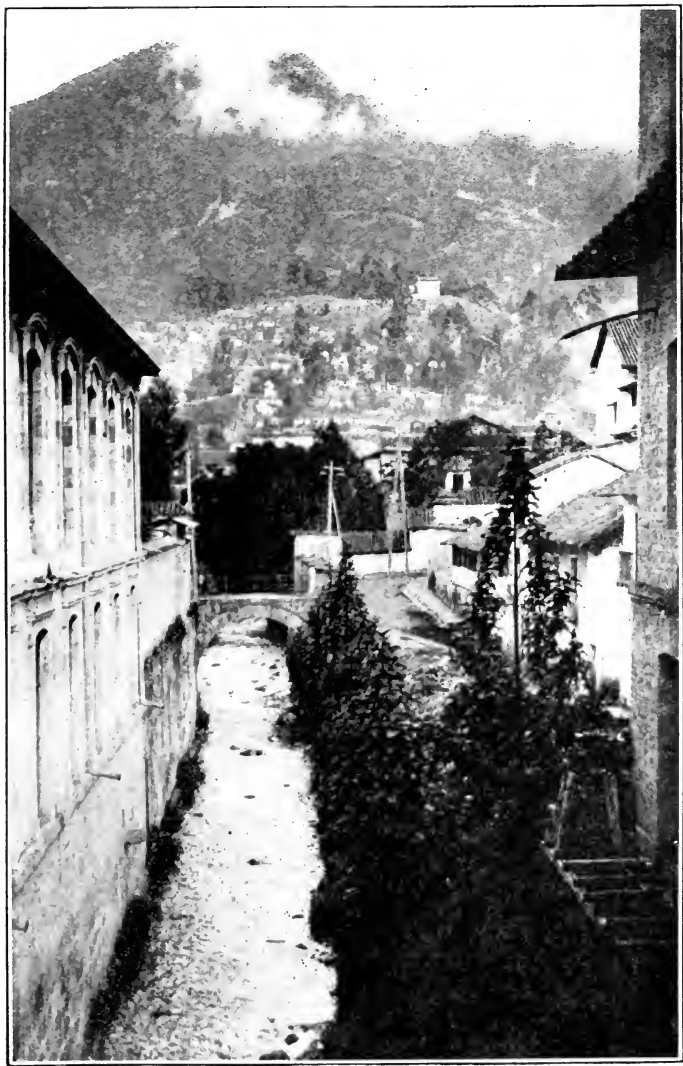
paved roads which cross gorges by means of light suspension bridges. Long before the discovery of America they erected stone shrines to their gods, were skillful weavers, dyers, and potters, and even had a form of money used in trade. The cool climate of the plateau and high mountain valleys made these people more energetic, so that they had better homes and applied intelligence to their work (Fig. 161).

The white people of Colombia live well above the unhealthful lowlands, on the plateau where the climate is invigorating. In spite of the fact that it is only a few hundred miles from the equator the winds are cool and the temperature mild. It is a land of eternal spring. The population is densest here: one hundred and twenty per square mile in the most thickly populated parts. The people live either on the high plains and basins or in the narrower valleys of the cool zone. It is also worth while to note that the people of Colombia live chiefly within the central valleys. Very few people live in the cool valleys

that drain toward the flat plains of the east or that run down to the Pacific, because it is extremely difficult to carry their products over the rough mountain trails. Though the climate of these places is mild and the soil fertile man finds his crops too far away from the trade routes. Goods from the outside world cost too much and the cattle and corn of the farms are too remote from market to benefit their owners. The forests on the outer slopes contain only a sprinkling of population (Plate X).

**The Cattle Ranches of the Cesar Valley.** Between the Rio Ariguani and the Magdalena the country is low and swampy, the water collecting in countless pools and hollows. Most of the low hills are occupied by cattle corrals. In spite of the abundant and extremely annoying insect life the swamps are favorite pasture grounds during a part of the year; indeed, between the Nevadas de Santa Marta and the Andes are some of the best pasture lands in the country. All the rivers of this region flow through beautiful savannas which support thousands of cattle. During the three summer months when the pastures of Valle de Upar on the higher land of the southern edge of the Sierra Nevada de Santa Marta are parched and dried up by the sun, the owners of the ranches set fire to the useless grass so that the new growth in the following wet season may not be so mixed with the dry grass as not to be readily found by the cattle. During this dry period the cattle are driven down to the fresh pastures among the islands of the Cesar River, where each owner has his house and grounds. The main business of the entire region is cattle breeding. The cattle are shipped chiefly to Cuba for the laborers of the tobacco, sugar, and cotton plantations.

**The Towns of Colombia.** Many of the towns and settlements of the plateau date from the days before the

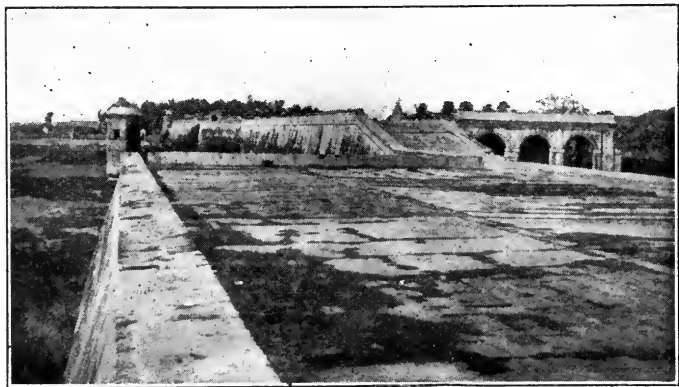


Courtesy of Hiram Bingham

FIG. 162. *Looking eastward from the center of Bogotá*

coming of the Spaniards, while others were founded as centers of Spanish authority and government, or as missions from which the missionaries of the Catholic Church attempted to Christianize the Indians. The country towns are very numerous, and form centers of trade where the farmers of the region gather for the regular weekly market. A few towns have their location determined not by the climate but by mineral deposits; others have their location determined by trade, as Zipaquirá by a trade in salt and La Mesa (halfway between Magdalena and Bogotá) by the exchange of goods between the high and the low lands. But no other city in the republic is nearly so large as Bogotá, the capital, with its fifty thousand people (Fig. 162 and Plate II).

At or near the mouth of the Magdalena is a group of small towns through which goods are shipped for the denser populations of the plateau. These are the ports of Colombia, but they give little indication of the number of people who dwell in the interior. Barranquilla, the



Courtesy of Hiram Bingham

FIG. 163. *The walls of Cartagena, built in the old Spanish days at a cost of many millions of dollars*



most important town (Fig. 156), is on the main branch of the Magdalena delta and is connected with the exposed seaport of Savanilla by a railway twenty miles long. Sand banks and shifting channels at the mouth of the river make it impossible for boats to sail up the Magdalena from the sea. It is as if New Orleans were shut off from the sea, as indeed it once was, and had to ship its goods to Mobile or Galveston, if these ports were near by. Between 1876 and 1884 a cattle trade with Cuba was carried on through the Boca de Cenizas, the main mouth of the river, without serious accident to the steamers, but this route is now abandoned in favor of the railway to the seaport.

West of Savanilla is the old and romantic port of Cartagena. In the days when Spain owned this coast Cartagena was a great center of trade, from which all foreign boats and traders were kept out, and where an immense fortress (Fig. 163) was built at a cost of many millions of dollars. The only other seaport on the Caribbean coast of Colombia is Santa Marta, at the foot of the mountain knot from which it takes its name, a place now grown famous as the center of a large banana trade.

**Bogotá, the Garden of Colombia.** Bogotá is the garden spot of Colombia, a favored region in which live a happy and prosperous people. The city is located in a basin about seventy miles long and thirty miles wide, surrounded by a high, treeless mountain wall, the source of numerous streams which, with a number of fresh-water lakes, supply water to the fields and add beauty to the landscape. Near the western edge of the basin plain all the streams unite to form the River Funza, or Bogotá, one of the principal tributaries of the upper Magdalena. Just before reaching the edge of the plain the river falls over a perpendicular cliff into a deep gorge four hundred and ten feet below, the Falls of Tequendama.

The principal rainy season begins about September 20, and lasts until December 20. During this time it rains almost every day. The mornings are generally clear, the rains beginning about noon and lasting until sunset. A shorter wet season occurs in April and May. The dry seasons last from January to April and from June to September, the sun shining from a clear and almost cloudless sky (Plate I). At night, on account of the high elevation at which the city stands, and the clear atmosphere, the stars appear unusually brilliant and much larger than when seen from the lower valleys or from the coast.

In this serene valley lies the city of Bogotá. It is built at the foot of two high peaks that reach almost to the limit of perpetual snow. The streets of the city run eastward up the lower slopes of the mountains, and are crossed at right angles by those running north and south. The squares thus formed rise one above another like the benches of a vast amphitheater (Fig. 162). Above the city are the terraced slopes and overshadowing peaks of Guadeloupe and Moncerrate, upon whose topmost peaks two massive cathedrals have been built. From either mountain one may look westward about ninety miles to the frozen summits of two lofty volcanoes, Tolima and San Ruiz, northward to the fertile valleys and table-lands of Santander and Boyacá, northwestward to the rich mining districts of Antioquia, while southward one may see ridge after lofty ridge whose slopes descend to the hot grasslands of southeastern Colombia.

**Revolutions.** Our newspapers say that the revolutions of Colombia show how unsettled is the political state of the country, but we ought to know that many of them scarcely produce a ripple upon the surface of Colombian life. A few people think they have a grievance against the government. They talk about it a few days and get

others to sympathize with them; some guns are purchased and a little trouble started, but the sight of a detachment of government troops is often enough to end what we are accustomed to call "a comic-opera war." Some of the so-called revolutions of South America are less serious than those of our labor strikes in which men are killed and government troops called out to keep order.

## CHAPTER XVI

### THE MOUNTAINS AND LLANOS OF VENEZUELA

**The Hunting Ground of South America.** Venezuela has been called the hunting ground of South America, not, as one might suppose, because of the many kinds of game that abound in its grasslands and tropical forests, but because of its government. Securing a part of the public money is to many of the officials what hunting wild game is to the sportsmen. The chief difference seems to be that the grafting official always succeeds while the sportsman may not. Everything else about Venezuela is of less importance to its people than the fact that the country has had until very recently one of the worst governments in South America. This is especially interesting to us here because it seems only yesterday that the United States was obliged to think very seriously of taking a hand in straightening out the political difficulties of the country.

The president of Venezuela for many years was an evil-minded person who ran the affairs of his country not as an honest man but as a criminal. He got control of the public money, robbed the merchants of other countries who tried to do business in Venezuela, imprisoned people who were unfriendly to his bad designs, and ruled less like a patriot than a thief. Under such a man the affairs of Venezuela fell into a bad way and business was completely demoralized. No one cared to sell goods to the people of the country for fear that either the buyer would be in prison and unable to pay for the goods or that the import tax would be so high the goods could not be

marketed. People who wished to go to Venezuela and to develop mines or plantations did not do so because their property might be seized or be so highly taxed that they might as well be robbed outright.

Blessed with the riches of a tropical plateau, where food can be produced in abundance, and where almost every kind of plant may be grown, Venezuela so far has been a most unhappy land. Think of a country where in the past seventy-five years there have been fifty-one revolutions—on the average, a revolution every sixteen months! We are proud to think that in our revolution of 1776 we spent some of the best blood in the country to become an independent nation. Such a revolution is heroic. It is planned from patriotic motives by men working not for their own personal good but for the good of all the people.

Far from this ideal are the revolutions of Venezuela. Civil war in Venezuela offers a chance to rob, not a chance to fight for a good cause; it is a time of pillage and burning, not a time for risking one's life for one's country; it is a chance for evil men to be evil without being punished; a chance for good men to be put into prison simply because they oppose those things that will harm the people. It is not the rising of all the people against a bad government but the rising of one group of bad men against another group of bad men with the common people but little interested in the result; for if they lose one set of robbers who run the government it is only to gain another set as bad or worse. It is this unhappy condition of affairs that has kept Venezuela from becoming the powerful and rich nation that it deserves to be. Its riches are manifold, and it is near the great buying nations of North America and Europe; all that it needs is a good government. With that assured, Venezuela will be completely changed.

Such a change in the condition of Venezuela we have a

right to expect at the present time. The despotic ruler has been driven out of the country. A new president has been elected. The people have become weary of being robbed and plundered by mean officials; of seeing their president grow rich when the money which he takes should be spent in making roads over which cattle could be driven to market and in building railways over which men might ship their fruits, cotton, and rice, and bring in the goods of other countries. The people of other countries hope that under her new president Venezuela will be free and her people happy.

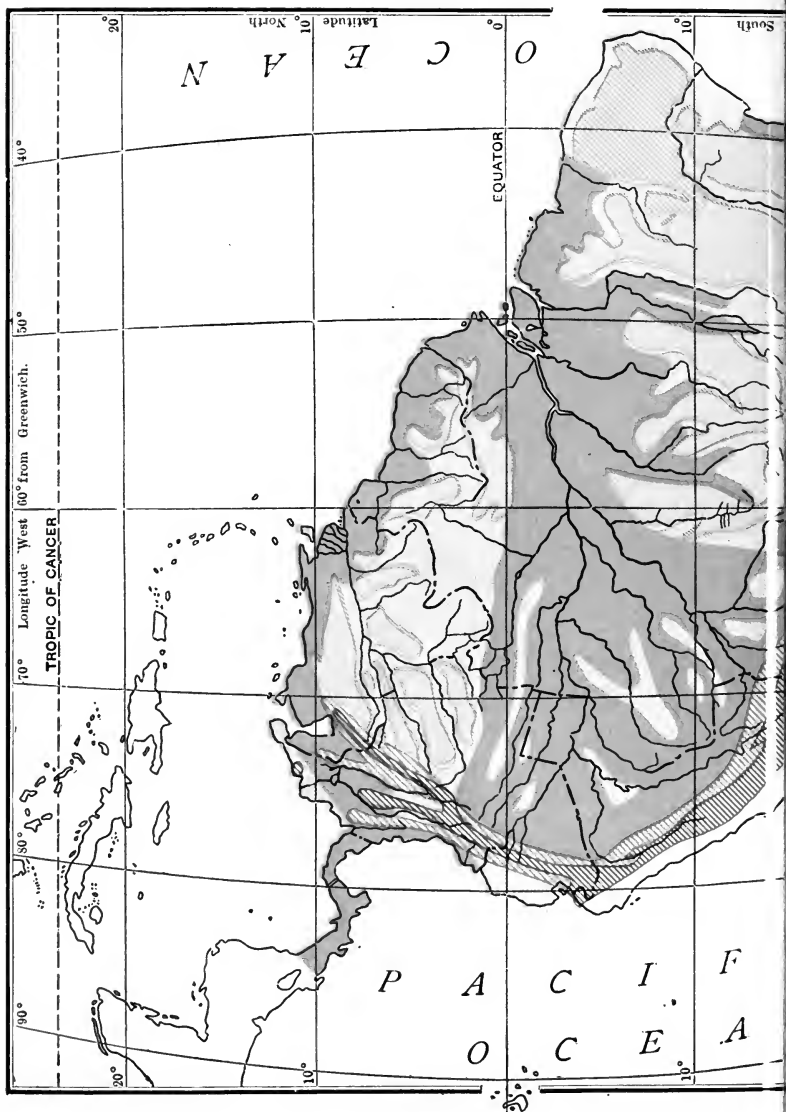
**Scenery and Towns on the North Coast.** Let us turn from these unhappy conditions to the brighter side of the picture, for Venezuela has indeed some very charming aspects. Its rivers, its mountains, its valleys, its ports are full of interest. It is also near our doors and we are naturally interested in our neighbors. It is only a seven days' sail from New York to Venezuela. In a week one may pass from our temperate land to tropical Venezuela.

The chief port of Venezuela and the one through which almost all visitors enter the country is La Guaira. Sailors call it the worst port in the world. It is merely an open roadstead, and even in calm weather there is a heavy surf on the steep shore; and when the wind blows, as it does almost every afternoon, the waves are so high that it becomes dangerous and sometimes impossible to load or to unload boats. They must then wait for the waves to subside. A pier and a few other works have been made to afford a shelter.

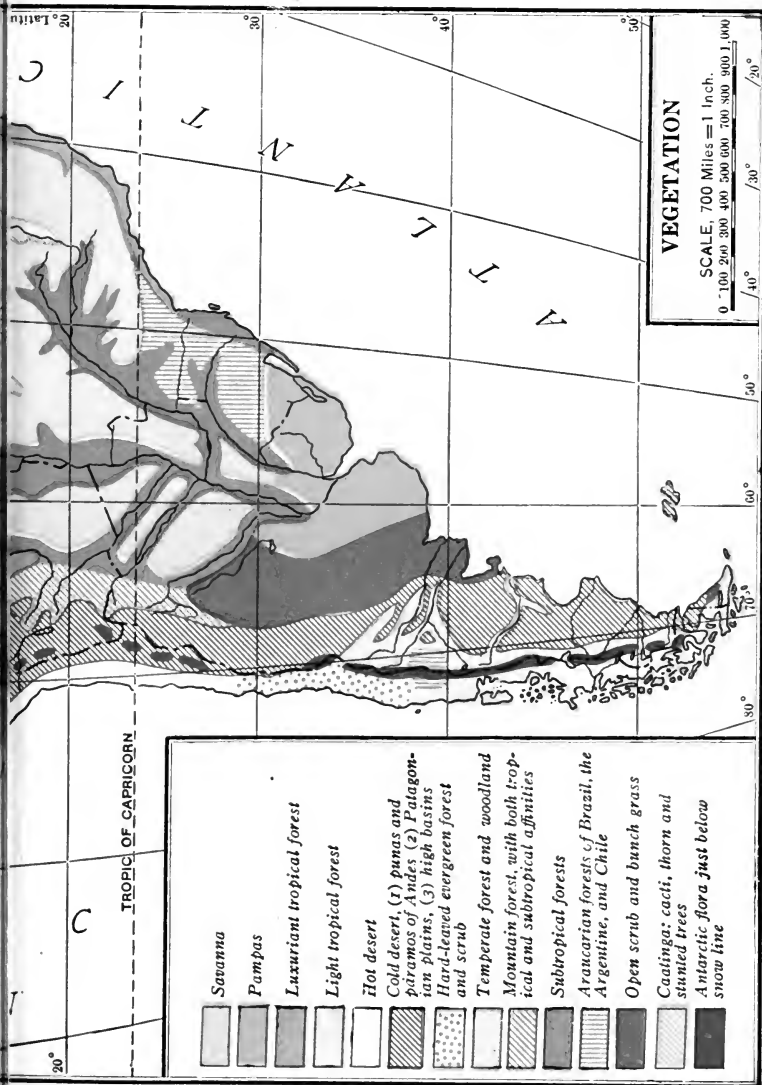
The town built about the port has a single street. This is because steep mountains run directly down to the shore and there is but little flat land on which houses may be built. Part of the town clings to the slope of the mountains and one wonders that, in this land of earthquakes,



PLATE X. *Density of population*





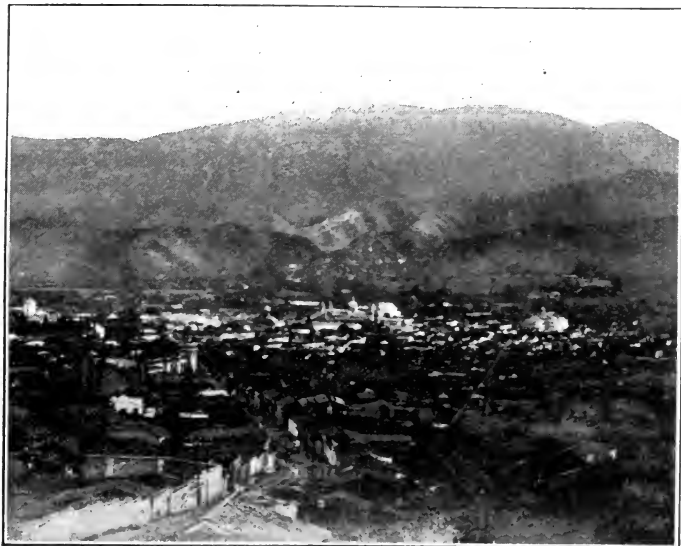


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PLATE XI. A vegetation map of South America



the houses are not shaken off into the sea. It is a small port, very hot, damp, and uncomfortable, and one feels



Courtesy of Hiram Bingham

FIG. 164. *View of Carácas, Venezuela*

more as if one were taking a steam bath than walking about in the air. Travelers are glad to get away from the sweltering port to the cool hills and mountains back of the town.

The railway across the coast ranges back of La Guaira unites Carácas, the capital (Fig. 164), with the seacoast and with the trade routes of the world. It is astonishing to find that the distance between the seaport and the capital is but a few miles in a straight line and yet that it takes several hours to make the journey by train. The reason for this is that the railway must cross the range of mountains that lies between the port and Carácas. The train first climbs over a pass, from which it descends

to the capital four thousand feet above the sea; and it requires so roundabout a course that instead of eight miles the train must travel twenty-three miles.

The scenery along the railway is superb and at the pass it becomes extraordinary: on one side is the ocean

and the port; on the other is the valley leading down to the city of Carácas surrounded by extensive plantations of sugar cane. The curves of the railway are extremely sharp and the line crosses splendid mountain gorges, beautiful valleys, and sharp mountain spurs.

From the foot of the coast ranges that lie between Carácas and La Guaira the land stretches away for hundreds of miles toward the interior of Venezuela as a



Courtesy of Hiram Bingham

FIG. 165. *The University and the Academy of History, Carácas, Venezuela*

succession of valleys and low ranges which at last give way to the great interior plains. Carácas itself lies in a beautiful mountain valley, surrounded by gardens and farms that supply food to the people (Fig. 164).

The city has many attractive features and the natives

are never tired of singing its praises. The plazas are objects of great care and beauty. The houses are low, one-story buildings, painted white, with stone and adobe walls and red-tiled roofs. On account of the uniformly low houses the town has a flat appearance, which is broken but rarely by the towers of the churches or the large roof of some high public building (Figs. 165 and 166). In the cafés one finds bright Germans, French, and English who are in Carácas on business or pleasure. They furnish small, gay groups that add an enlivening foreign air to the town.

**The Surface of the Country.** The northern part of Venezuela is rugged and mountainous, and mountains border it on the southeast as well. But in the interior of the country between the mountain systems are the broad plains of central Venezuela, the grasslands, or *llanos* as they are called. Between the two extremes of lofty mountain and low, flat plain are all kinds of scenery and



Courtesy of Hiram Bingham

FIG. 166. *Carácas, Venezuela. Avenida del Sur, the principal shopping street, looking toward the cathedral*

every variety of climate. The Sierra Nevada de Merida (in the northwestern part of the country) alone among the



Courtesy of Hiram Bingham

FIG. 167. *On the road to Barinas, western Venezuela. On the right are the eastern slopes of the Andes; on the left, the piedmont plains that stretch away from the foot of the mountains*

mountains of Venezuela has three or four peaks that rise into the realm of winter. Elsewhere the mountain summits generally have a covering of vegetation.

Descending from the snowy peaks one passes first through the region of mild temperature and beautiful climate, then the hot lowlands of the interior. At the mouth of the Orinoco one may even sail through plains so low that the land for many miles stands only a few inches above water. Since each climatic belt has its own characteristic plants and animals, Venezuela is far from being a monotonous country.

**The Three Kinds of Plains in Venezuela.** To understand the plains of central Venezuela one must know that they are not all alike. Three quite different kinds of plains may be seen in going from the mouth of the Orinoco to its headwaters in the mountains of eastern Colombia. They are all alike in being generally flat, but each was formed in a different way. The plains at the mouth of



the great sources of wealth, the herds of cattle and mules that graze upon their wide pastures.

**The Delta Plains of the Orinoco.** The size and nature of the delta plains at the mouth of the Orinoco may be realized from the map (Fig. 168). This shows the large number of river channels that cross them. Instead of having one channel to the sea, the Orinoco has many channels since it is a delta-building stream. The river splits up into a dozen different branches and these again into others until there is formed, as the map shows, a bewildering network of criss-crossing and interlacing channels. The whole of this tract is a great swamp with only a few people but with the most luxuriant vegetation. For thousands of years the Orinoco has been bringing down mud, silt, and sand and depositing them at its mouth. Gradually the land has been built up until it stands above sea level, but so little above that sometimes it is hard to tell where the sea begins and the newly made land ends. As the swamp dwellers at the mouth of the Mississippi say: "The best way to tell land from water is to set up a stick: if it falls over call the surface water, and if it stands up call it land." Here upon this half-drowned edge of the continent Columbus first thought that he had found a continent, for he argued that such an enormous body of fresh water could be collected only from a river having a long course, and that the land must be not an island but a continent.

Upon the marshes of the lower Orinoco it might seem as if no one could live, the land is so wet and the climate so hot and unhealthful. Few indeed are the people who dwell there, but a number of Indians do make it their home and find among the swamps and lagoons of the delta both food and shelter. These Indians belong chiefly to the tribes known as the Warraus that were described



by Raleigh and many later travelers. A few thousand of them still survive, but they are fast decreasing in numbers on account of their many wars, occasional epidemics of disease, the influence of alcohol sold to them by unprincipled traders, and the work they are sometimes compelled to do on the up-river plantations. Once these Indians dwelt farther inland, but they were driven down into the delta by the strong and fierce Caribs, or Caraios, who in their long war canoes raided their neighbors in both the Amazon and the Orinoco basins and conquered many of them.

The delta of the Orinoco has many surprises in store for the traveler who paddles up its muddy waters. Not the least of these is the way in which new land is being slowly made by the work of a tree called the *mangrove*. It fringes all the shores of the delta, lines the channel banks, and grows on the border of every lagoon. The mangrove tree is peculiar in living chiefly in the water, not chiefly in the earth as is the case with most ordinary trees. Its long roots—which give it the appearance of standing on stilts—are sent down through the shallow water and only their lower ends are secured in the bottom mud. It seems as if a slight push would topple the mangrove over, but it is really well anchored and will grow even where there is a moderate surf. Crabs, turtles, and fish, besides many other forms of water life, may be found about the roots. Mud and sand brought down by the streams lodge there also, and, accumulating year after year, slowly build up the bottom and make dry land. If it were not for these “marine forests” the land would not have been extended so far.

The great geographer, Humboldt, when he visited South America in the early part of the nineteenth century, made a voyage up the Orinoco. It is interesting to know

that he thought the people of Venezuela represented the three states of human society: the life of the hunter in the woods of the Orinoco, the pastoral life of the ranchman on the grasslands or llanos, and the agricultural life in the high valleys and at the foot of the mountains on the coast. In large part this observation is true of many other countries of South America besides Venezuela, but it will help us to remember the nature of the people of Venezuela none the less to know that it describes their threefold division very accurately. So, having had a glimpse of the savages who dwell among the channels and islands of the Orinoco delta and find food and shelter in its vast swamps, let us look next at the kind of life that depends upon the grassy river plains along the Orinoco and its tributaries.

**Scenery of the Grasslands.** Upon the vast plains or llanos of the Orinoco valley the eye finds many resemblances to the sea. In a wide view the almost level plains stretch out mile after mile toward the horizon; the slight irregularities everywhere visible are like the waves, the clumps of trees that dot the plains seem like islands, and the distant range of mountains like the shore. Let us not forget, however, that the plains are not smooth everywhere. The flattest and lowest portions lie along the valley floors of the large rivers like the Orinoco. But in places the tributaries have cut their valleys below the higher plains away from the rivers and have furrowed them so deeply that when one tries to cross the country one finds it in some places decidedly hilly. So that there the dissected plains do not appear like a waveless sea but rather like a choppy sea. This undulating surface is also broken by jutting masses of harder rock that make island-like interruptions (Fig. 169).

“From the higher slopes a prospect is commanded of one of the grandest scenes in nature. At your feet lies

a lovely expanse of meadow, fresh and smooth as the best-trimmed lawn, with troops of horses and countless



Courtesy of Hiram Bingham

FIG. 169. *The llanos of Casanare, Colombia*

herds of cattle dispersed over the plains. Here and there the eye alights on glittering pools and lakelets left by the last rains, and now alive with an immense variety of aquatic birds. As far as the gaze can reach, the undulating grassy plain appears like a shoreless ocean petrified after a storm. No language could convey a true picture of the varied beauties of the scene—the harmonious effects of light and shade; the blending of the various green, blue, and purple tints flitting in the sunlight over the vast panorama; the stately palms gracefully fanning the glowing atmosphere, with their majestic crowns of broad and shining foliage.” (Keane.)

The grasses of the llanos are of many varieties. Some of them are soft as silk and contain food of the best kind for cattle and horses. Others are of more interest to the botanist than to the herder, for they are more curious than valuable. The *gamelote* is of this kind. It grows tall and sharp and cattle will not eat it, while the *llaneros* or cowboys curse it, for it cuts their hands and clothing and the legs of their riding animals.

**The Great Orinoco.** The course of the Orinoco is extremely irregular and winds in and out in the habit of rivers that flow through flat plains. It is bordered by magnificent trees that form narrow bands of forest along each bank of the stream. The traveler once in a while catches a glimpse of open savanna, but for miles at a stretch it will more often seem as if he were traveling through a forest country rather than through a grass country whose rivers are lined with trees.

During the rainy season (from April to November) the river overflows its banks and floods the surrounding lowlands. The great floods transform the plains of the Orinoco into a vast inland sea, in places one hundred to one hundred and twenty miles in extent from north to south and hundreds of miles from east to west. The floods are especially well marked at Ciudad Bolívar, where the water sometimes rises forty or fifty feet and submerges the country far and wide. The river covers the lower parts of the tree trunks, makes broad lagoons along the path of the river, and often completely changes its course for miles. The effect of an overflow is seen also in the large masses of tree trunks, branches, grass, and bushes that are overwhelmed and swept into the stream. The branches of the trees catch on the bottom and become lodged, other trees and branches are lodged against them, and soon there is a natural raft which, if it grows to great size, may be a hindrance to navigation.

It might seem as if the floods of a great river like the Orinoco would make large tracts of country useless and would either prevent man from coming into the zone of floods or drive him out in case he made an attempt to live there. Such indeed is the case in many places. Parts of the Mississippi valley are not occupied by man because the excess of water makes farming too difficult. Many other

rivers of the world act in this manner and discourage the people who attempt to make homes along their borders. Much of the land along the Mississippi has been reclaimed, however, by the building of great dikes or levees which restrain the water in time of flood and prevent the loss of cattle and crops.

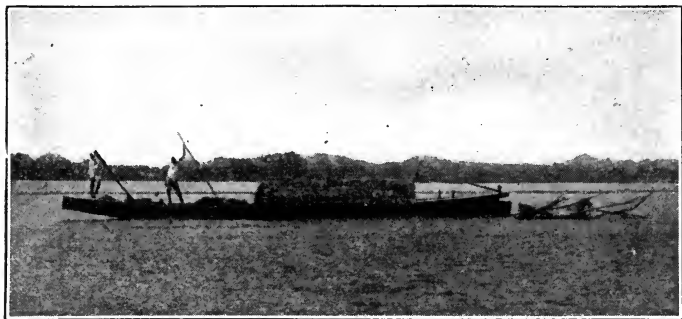
But the people of the Orinoco valley neither run from the river nor build dikes to any extent to keep it in its regular course. Instead, many of them live in houses built on piles or long poles driven into the ground. When the river is low and the ground free of water they live on the ground, but when the water rises they move to the floor above. Life would not be possible in many places without dwellings built on piles, and the people would find it difficult and sometimes impossible to travel without the boats and canoes in which they are accustomed to make their way from place to place, looking after their live stock on the higher ground away from the river and gathering a food supply. Even some of the wealthiest people of the lowlands have rude houses built of mud and piles.



Courtesy of Hiram Bingham

FIG. 170. *Junction of the two principal tributaries of the Apuré River, western Venezuela*

**A Seaport in the Llanos.** One of the most noted cities in Venezuela is Ciudad Bolívar, partly because it is one



Courtesy of Hiram Bingham

FIG. 171. *A bongo on the Apuré River*

of the few ports of the country, partly because it is in the grasslands and reflects their interesting life. It lies about halfway between the delta of the Orinoco River and the mouth of the Apuré—the main branch of the Orinoco. Its old name, Angostura, is a more descriptive name than Ciudad Bolívar. Angostura means “the narrows,” and refers to the fact that the river banks are here close together, and a single port serves the people on both sides. The name was changed to Ciudad Bolívar, or city of Bolívar, in honor of the patriot Simon Bolívar who fought for years against Spanish rule and at last freed his country and made it a republic. He is often called the George Washington of South America. A fine statue in his honor is in one of the principal plazas of both Carácas and Ciudad Bolívar. On the left (north) bank of the river and across the stream, here only a half-mile wide, is the town of Soledad, which it is planned to connect with the capital, Carácas. A railway between these two cities would bring into use large regions where now there are few civilized people and would enable

Venezuela to reach lands that without the railway would be occupied only by a few scattered Caraio (Carib) and Arawak Indian hunters.

Farther up the Orinoco is a great tributary, the Apuré, (Figs. 170 and 171), which has its source in the mountains of Colombia several hundred miles west. Here is the very heart of the llanos of Venezuela, the grassy plains with their herds of cattle, horses, and mules—a great ranch country where men are accustomed to the saddle as the people of our towns are accustomed to street cars, where the roads are trails, the river crossing a ford (Fig. 172), and where cattle are the currency of the land. Here is to be found much of the wealth of Venezuela and practically all of the wealth of the interior. What rubber is to the Amazon Basin, tin to Bolivia, and nitrate of soda to the people of Chile, the cattle and mules of the llanos are to the people of Venezuela. There are other and more important industries in the northern valleys near the Caribbean—for example, cacao, coffee, sugar, and fruits of many kinds—but the heart of the country, the great



Courtesy of Hiram Bingham

FIG. 172. *Crossing the Pagui River, western Venezuela*

interior, is a country of pastoral peoples, the cattlemen and herdsmen of Venezuela.

**Ranch Life on the Llanos.** The life and scenes of this great region are very like those of our grasslands in parts of the West fifty to sixty years ago. There is the cowboy, the corral, the camp, and the long drive to market, for much of the region cannot be reached by boat and there are no railways. Large steamers go up the Orinoco only so far as Ciudad Bolívar, at the head of tidewater, two hundred and sixty miles from the sea. During the rainy season, when the waters are high and the river deep, smaller steamers continue the river trip from Ciudad Bolívar to Nutrias on the Middle Apuré and there is an irregular service of steamers from the mouth of the Apuré to Ciudad Bolívar more frequent than that to Nutrias. These irregular steamers are the only means the people have of sharing the trade of the outside world. It is a vast, lonely interior which can never have a great development until railways make it possible to export cattle more easily. Until then the cowboys must drive their cattle long distances to the rivers and wait there for the steamer that may not come for two or three weeks (Fig. 173). Since there is a limit to the distance that cattle may be profitably driven to market, much of the interior country is unused except by a few Indians and here and there a lonely settler who has made his home in the wilderness and lives in an independent way far from any neighbor.

**The Prairie Fires of the Grasslands.** One of the great sights of the llanos are the grass fires that rage every year during the dry season. They may be started by some one who wishes to burn the range so that the new grass of the wet season will grow faster and be more easily obtained by the cattle, or they may be started by accident



or by lightning. Once started, the fires spread with astonishing rapidity and sweep miles of country before they are stopped by rain or by a river. Sometimes they burn through the night and light up the prairie for miles about with a pale yellow light as if the sky were on fire. During the progress of a fire crowds of long-tailed scissor birds hover round the edge of the flame and eagerly swallow insects that rush out of the fire half stupefied by smoke. On bushes and trees eagles and falcons eagerly



Courtesy of Hiram Bingham

FIG. 173. *Cattle on their way to market, llanos of Venezuela*

watch for some frightened animal that rushes from the flames only to fall a prey to the hungry, waiting birds.

**Cattle Driving in the Northern Llanos.** Between the Apuré and the northern mountains of Venezuela are the most used and the best known of the Venezuelan llanos. From the town of San Fernando on the south toward Valencia and Carácas on the north there are rolling savannas grazed by thousands of cattle. During the dry season the cattle are driven along the Apuré (Fig. 170) where the grass, on account of the wet condition of the ground, grows well even during the season of little rain. When the rains set in the cattle are driven to the high northern savannas; those that are ready for market are then separated from the rest of the herd and driven to the end of the railway, where they are shipped to the seacoast

or sent to the towns that depend upon the llanos herds for meat. The high savannas are too dry for pasture during the dry season (November to March), and although a few herds are kept there the whole year round they do not fatten well. The rains therefore control the migrations of the cattle in Venezuela in the same way that the seasons control their migrations in mountainous regions like the Alps or the Pyrenees.

The lower llanos, as the region between the drier upper pastures and the Apuré is called, and the upper llanos south of Valencia are divided into great ranches by long barbed-wire fences which are built by the cattlemen in common just as they also drive their cattle in common in going back and forth between the upper and the lower pastures.

The cowboy of the llanos is called a *llanero*. He wears a broad felt hat and cotton suit, the trousers having a long slit at the side. He always rides a mule, of which he is an excellent judge, is generally armed with a revolver and knife, is a good shot, and seems good-natured and honest. He lives on corn cakes toasted over the coals, beef or veal, eggs, bananas, cheese, and coffee.

**Animal Life of the Llanos.** The marshes and lagoons along the water courses of the llanos fairly swarm with birds of many kinds. There is the white heron from which are obtained valuable egrets, used in trimming ladies' hats. The heron is in danger of extermination on account of the numbers that are shot for this purpose every year. Our Congress has set a good example to the rest of the world by passing a law preventing their importation into this country. There are also the flamingo with its great breadth of wing, the scarlet ibis, and the rose-colored spoonbill. In places a less valuable kind of heron as well as many other kinds of birds are found in

great "heronries" which are sometimes miles in extent and include crane, stork, ibis, and other kinds of birds of many colors from gray to a brilliant scarlet. There is also a small duck, the *guiriri*, so called from its cry, and which at times rises in such numbers as almost to obscure the sun.

Along the banks of the streams, especially of the middle Orinoco, there are also to be found great numbers of turtles. Some of them are three feet long and weigh seventy pounds. They lay great numbers of eggs, from which are obtained every year about twenty thousand gallons of oil.

One of the tributaries of the Orinoco is called the Tortuga, which means turtle, a name given to it on account of the large number of turtles that live on its banks during the months of March and April. The long sloping sand banks are their favorite nesting places, and to those places the natives go in canoes to collect eggs and to kill the turtles for their shells, which are used as basins and cooking pots in many Venezuelan households.

In the rivers are to be found the *manatee* and the giant otter, besides fish of many kinds. Some of the fish are of curious forms and habits. There are electric eels of great size with a battery strong enough to give a powerful electric shock to men who attempt to cross the streams by wading or swimming or to horses that come down into the shallow, muddy pools of water to drink. There is the *paillara*, somewhat like the salmon, but with large tusks working through horny nostrils and a dangerous looking row of teeth behind the nostrils. The most dreaded of all is the *caribe*, a bloodthirsty creature with a head somewhat like that of a bulldog and with a projecting lower jaw. It has sharp three-edged teeth with which it can break the strongest fishhook. Large numbers of this fish quickly gather round and kill the weaker

animals that cross the stream, and will even attack wounded alligators as well as the crocodile.

Among the reptiles of the Orinoco valley which are feared by man the huge anaconda or water snake is most important. There is also the boa constrictor, which lives in the woods and eats wild animals such as deer or even tame calves and colts that stray into its haunts. A very poisonous species of snake is the *mapanare*, which lies coiled up on the branches overhanging the river and strikes quickly downward at animals passing beneath.

Of the other animals of the Orinoco lowlands perhaps the most interesting is the jaguar, which makes its home in the dense forests and is held in great dread by the country people. Each year lives are lost on account of the ravages of this fierce beast. The puma is a cowardly animal as compared with the jaguar. It makes its home in the hills and is little feared. The haunts of the great gray tapir, the water-hog, and the peccary are the wet jungles along the river banks. In the grasslands beside the river are hundreds of the small savanna deer. These come out of the forest morning and evening to feed on the sweet savanna grass, though it is hard to approach them, for they are extremely wary and as timid as mice. In the forest patches scattered throughout the savanna country or the llanos, and along the streams, are to be found monkeys; but these are rather scarce now since they are so constantly hunted by the Indians for food. Few animals that the Indian of the llanos hunts are so delicious to his taste as monkey.

**The Forest Lands along the River.** Among the trees of the llanos region are many which serve the needs of man. The palm flourishes here greatly to man's benefit. One kind is called "thatch-palm" by the settlers and ranchmen, who use it in making a thatch or roof for

their houses (Fig. 174); it is called "hat-palm" by the hat makers, who braid it into sombreros; and it is called



Courtesy of Hiram Bingham

FIG. 174. *Typical ranch house on the llanos of Venezuela*

"fan-palm" by travelers, who use its leaves to drive away the troublesome insects. Then there is a tree called the *mimosa* which is like the willow and spreads aloft a delicate feathery crown like a dainty parasol. In some of the valleys bordering the plains are mahogany, cedar, rubber trees, and cinchona of several kinds. The upper waters of the Guaniamo are so affected by the sarsaparilla growing in great numbers along its banks that the people who live in the valley drink the water and bathe in it in order to cure themselves of skin diseases, of which they have many kinds.

**The Region of Woods.** Southern Venezuela is called by the natives *La zona de los bosques*, which means "the region of the woods." It will be worth while to see in what respects its life differs from that of the plains. It is but little known and has a thin population, but it is one of the most interesting and certainly one of the most mysterious parts of the country and holds many wonders that tempt the traveler. Here are forests so vast and so dense that men can travel through the region only by

following the water courses. Back from the river lanes the vegetation is so thick that man can hardly cut his way through it. Even the Indians that dwell in the gloomy depths of the forest or on the banks of the rivers that thread through its great jungles know but little about it except that it is the home of the wild beasts which they hunt for food; they believe also that in its shadowy depths dwell evil spirits that lie in wait for the unwary.

**The People of the Forest.** The men who dwell in the tropical forest of southern Venezuela are few in number and follow the life of the hunter. They have all sorts of superstitions about the hills and valleys. Demons live among the inaccessible crags of the mountains of the south and cause the thunder, the lightning, and the wind. Upon one of the mountains their legends have placed a large lake so deep that it cannot be fathomed, and its waters are believed to be the abode of huge and strange creatures not found elsewhere.

A peculiarity of these people of the forest, living as they do far from neighbors, is their differences of speech from place to place. Each village has its distinct dialect, and this is true even in the case of a small village. Yet it is a perfectly natural effect of the kind of country in which these people dwell. It seems to be due to the lack of any easy means of travel and trade. The forest is so dense and vast that it keeps people apart, and wherever this happens anywhere in the world each group becomes unlike its neighbors. Small differences spring up and grow until a separate dialect is developed. Neighboring villages have long-standing blood feuds, and their bitter quarrels have added to the effect of the forest and increased the differences not only of speech but also of manner.

**The Scattered People of the Caura Valley.** The great Caura tributary that rises within the mountain systems

of southern Venezuela flows through dense forests and the wildest mountain country and at last comes out upon the



Courtesy of Hiram Bingham

FIG. 175. *Canoe on the Magdalena loaded with bananas*

plains that border the Orinoco. During the rainy season small steamers may go up the Caura for some distance; but it is impossible for them to go beyond Temblador, where the journey becomes dangerous for dugout canoes. For forty or fifty miles the country is a rolling grass-covered plain, bordered by belts or patches of forest in the low ground and along the streams. The entire region is thinly populated. With the exception of Maripa few of the places can be called even villages; they are merely clearings where rice, sugar cane, bananas, potatoes, and yams are grown, and where one may find a house or two, the home of the settler to whom the little plantation belongs. The people do business in tonka beans, cedar, and copaiba oil. Some years ago tonka beans brought as much as four dollars a pound and collecting them

became the principal business of the people, but to-day the price is very low and the people have turned to the raising of rice as their principal means of livelihood. This they ship to Ciudad Bolívar.

**The Indians of the Caura.** On the upper waters of the Caura the Indians appear, first those that depend partly upon agriculture for food and live in clearings in the forest and then Indians that live by hunting and fishing. The little Indian farms of the clearings are worked in the most simple way. Corn is planted in a hole made by thrusting a sharp stick into the ground. Some cotton is grown and is employed in making hammocks, which the Indians use almost entirely as sleeping places. Even those Indians that till the ground get a part of their food supply from forest and stream. They are expert fishermen with the bow and arrow and also use the hook and line. All game which they keep from one day to the next is smoked. When food happens to be plentiful they eat a great deal, frequently getting up in the night to eat, and when there is no food on hand they go hungry. In the immediate neighborhood of the clearings, game is scarce, but now and then a tapir is killed, or a wild hog or peccary, when he visits the garden, but this does not happen often.

**The Wild Mountain Country of the South.** Along the southern border of Venezuela are the mountains of the Serra Pacaraima and Serra Parima. This is the southern frontier of Venezuela, where only wild savages dwell, a little-known and mysterious land into which the white settler will not venture for many years to come. It is the land of crag and wild beast, of forest and savage Indian. When the Commission appointed to lay down the boundary between Venezuela and Brazil in 1880-1883 did their field work they did not even visit the Parima and Pacaraima highland; they merely guessed



at the positions of the mountain crests and drew their boundary lines accordingly.

**Coastal Features and Harbors.** The interior of Venezuela is not easy to reach from the sea on account of the obstacles which lie along its coast. The Orinoco delta—low, hot, marshy, bordered by mangrove swamps, and without products useful to man—stretches along the eastern coast for seven hundred miles, almost as far as from Charleston to New York. Along the northern coast a range of mountains borders the shore, and its steep slopes descend to sea level, offering only a few havens where ships may lie safely at anchor and load and unload their cargoes. One coast is too low and the other too high; one is too flat, the other too steep; one has abundant channels to the interior where the interior is of least use to man; the other has no natural harbors where harbors are sorely needed, for most of the present wealth of Venezuela is to be found along the north shore and the country bordering the southern edge of the coast ranges. The only stream in all Venezuela that is navigable from the sea, besides the Orinoco and a few of its longest branches, is the Catatumbo, which empties into the Gulf or Lake of Maracaibo on the northwestern coast. It and its chief tributary, the Zulia River, are navigable by small steamers throughout the year. Even this river system, small as it is, belongs practically in part to Colombia, for it is through the upper valley that the Colombians of the province of Magdalena find their way to the sea for travel and the shipment of goods.

**The "Little Venice" of Venezuela.** The only deep embayment along the whole coast of Venezuela is the Gulf of Maracaibo to which the Catatumbo is tributary. But if Venezuela has no good natural harbors on account of the mountains and the delta, and if her inlets are few in

number, she has at least the distinction of having the largest inlet on the entire northern coast of South America: the Gulf of Maracaibo. It should really be called a lake because its waters are fresh, a condition due partly to the large amount of rain that falls upon the seaward slopes of the coast ranges and is carried down to the Maracaibo by its many tributaries and partly also to the fact that at the mouth of the lake there is a huge sand bar which practically keeps out the tides and prevents the salt and the fresh water from being mixed. The "Sack of Venezuela," as the gulf is called, has an area as great as the state of Rhode Island—nine thousand square miles.

At this point on the coast of Venezuela there is also an outer embayment, the Gulf of Venezuela. Sometimes it is called the Gulf of Venice for a rather interesting reason. When Hojeda and Vespucci, two Spanish explorers who sailed the coast of Venezuela in 1499, first came in sight of the outer gulf they found there a group of water-houses, or dwellings on piles with waterways between the rows of dwellings, and canoes tied to the posts. The picture seemed to them very much like that at Venice where the houses are built on the water's edge and the canals are used in place of streets, and where every one makes his way about in gondolas. So they called the place "Little Venice," and the inlet for a time was indeed called Venice. Little Venice is translated in the Spanish "Venezuela," a pretty name that soon spread to the whole region. This was the name given to the Spanish colony of the place, and when the colony became independent through the work of Bolívar and others, the republic they formed was called Venezuela.

Since the Gulf or Lake of Maracaibo is the natural outlet of a large region which includes not only part of Venezuela but also a portion of Colombia, a large town has grown

up through which the business of the country is done. This is the town and port of Maracaibo, built on the shore of the channel connecting the outer and inner bays. It is the chief port whence are sent the coffee grown on the hillside plantations, the cacao from the lowlands about the shores of the bay, the cattle and hides from the ranches of the hills and mountain valleys that rim the gulf and the grasslands that stretch south of them, the minerals that are mined in the mountains roundabout, and all the other produce of the region. Here are also found even to-day pile dwellings like those that gave the name to the region and still lend a peculiar aspect to the place. In the life of the Maracaibo streets there is a curious mixture of speech and habit. The old dwellers on the shore are still here, and here too are the Indian of the uplands, the Spanish planter and ranchman, and French and German merchants with their stock of imported goods for shipment to the interior.

## CHAPTER XVII

### THE GUIANAS: THE ONLY EUROPEAN COLONIES IN SOUTH AMERICA

**The Three Guianas.** Upon the northeastern shore of South America are three colonies of special interest because they are the sole mainland possessions of European countries on the continent. They are the Guianas—English, French, and Dutch Guiana. We hear little about them in this country, for they are not generally visited by tourists as is the case with most other countries of South America. They have had a rather complex political history, having changed hands several times after the close of one or another European war. One may, however, find in them many things of interest: beautiful landscapes, great waterfalls, curious peoples, and large towns.

**Where the People Live.** While the Guianas are of considerable size, they are so hot and unhealthful that few white people live in them, and these for the most part live along the coast and the banks of the rivers. More than nine tenths of all the people live on the low, hot, fever-stricken plains within four or five miles of the sea. Only about one hundred and fifty square miles are under cultivation in British Guiana, about sixty-five square miles in Dutch Guiana, and but fifteen square miles in French Guiana. French Guiana has been used for many years as a penal station to which are banished convicts from France sentenced to more than eight years' hard labor (Fig. 176). The most successful of the three colonies is British Guiana, with a white population of more than a quarter of a million. Dutch Guiana comes

next, with a population of eighty-five thousand, while French Guiana numbers but thirty thousand people.

**The Swamps and Dikes of Guiana.** The lowland portion of Guiana is from thirty to fifty miles wide and extends landward as an alluvial plain in which the streams deposit clays and sands, and great masses of tangled vegetation, that come floating down from the forest-bordered banks farther up stream. The outer shore is bordered by mangroves and courida bushes in very much the same way as these water-loving plants border the outer shores of the delta of the Orinoco and the banks of all the streams. About the matted roots of the tangled mangroves, water-loving sedges take root, and these and the roots themselves clog the rivers and make them deposit their silt, gradually building up the bottom until a tract formerly under water is made into marsh and finally into land.



Courtesy of W. D. Boyce

FIG. 176. *Convicts on the way to work, Cayenne, French Guiana*

The courida bush has a great mass of club-like roots projecting above the bottom muds and anchored in them.

Neither the hot sunshine at low tide when the roots are exposed to the air, nor the salt water at high tide, have any bad effect upon the plant, though such extremes would destroy an ordinary tree. But if a planter cuts down the courida or the mangroves to let in the cool breeze, the sea gnaws away at the roots until they are destroyed and then invades the land.

Upon the flat lowland the English, Dutch, and French have laid out plantations of sugar, rice, and tropical fruits. The narrow strip of land along the coast on which these plantations are found is not more than eight or ten miles wide. The traveler to Dutch Guiana is surprised at the sight of certain features which are thought more characteristic of the Netherlands than of the Guianas of South America. The land lies so low that it is constantly threatened by the sea, and the people have at great expense built a sea dike for the protection of their homes. But the defenses of the Dutch have not always been successful. At one time the settlement of Nickerie on the Corentyn River had streets lined with stores, public buildings, and churches. But bit by bit the land was torn away and one house after another carried off, until finally even the gardens back of the town were invaded, and to-day only a small part of Nickerie remains.

The lowland rivers wind about in the most erratic manner before they reach the sea. In many cases the narrow necks of land between river curves have been connected by short, deep, and navigable canals built with the painstaking care for which the Dutch are famous, creeks and canals completing an intricate system of waterways which combine the features of Venice and Holland.

Except for a few diamonds and a little rubber and

valuable wood, from the interior, the products of the Guianas come wholly from the alluvial lands near the sea. Sugar (Fig. 177) has always been the most important export together with the related products, molasses and rum. Coffee was produced at one time in large amounts, but its production has never compared with that of the great coffee countries. The lowlands are admirably suited for rice, which requires repeated flooding and increasing quantities of fine quality are raised, besides sea-island cotton. The chief difficulty arises from an occasional drought. For example, in 1911-1912 the rainfall was so scant that but fifty per cent of the average amount of sugar was exported and the rice crop of March and April was a complete failure. Dutch Guiana also produces important quantities of tropical fruit and French Guiana exports cacao, besides sugar and coffee.

**The Savannas and Mountains of the Interior.** Inland from the low coastal strip of the Guianas are the savannas



FIG. 177. *Laborers' dwellings on a sugar plantation in British Guiana*

or grassy plains like the llanos of Venezuela, and with somewhat the same kind of life. Farther inland are the mountains and low plateaus, the most famous and the highest of which is Roraima (8,635 feet), in British Guiana, a great sandstone table with bordering rock walls three thousand feet high, the first half of the descent being vertical. From the top of this table mountain there fall several small streams which are far and away the highest waterfalls on the earth—sixteen hundred feet. So high, indeed, are these wonderful cascades that long before the water reaches the foot of the cliff it is blown into thousands of ribbons of spray.

The most famous of all the great falls of the mountain country are the Kaieteur Falls in the Potaro valley with a drop of seven hundred and forty-one feet—more than four times as high as Niagara. So deep is the gorge into which the great river tumbles that only now and then does a sound come out of the depths other than the subdued rumble that may be heard at all times. When the wind blows from below, a deep roar comes up from the river-worn caverns. The spray rising from the falls waters the gorge walls copiously and supports a brilliant green moss which lends a dash of color to the otherwise somber Guiana forest.

**The Animals of the Coastal Swamps.** In the swampy districts of the coast are found the marsh deer, and the wild dog which hunts in large packs like the wolves of northern countries. In common with other regions in South America, the lowlands of Guiana are also the home of tapirs (Fig. 178) and several kinds of peccaries that travel about in herds of a hundred or more, and are sometimes dangerous to man. Here also are found the bell bird, with a musical note that sounds like two iron bars struck together; and the *quow*, which is about the size of a pigeon



and makes a deep, low sound like the lowing of a calf, and is generally called the "calf bird." Millions of waterfowl of many kinds live on the river banks and find their food in the muddy water of the rivers or in the tangled depths of the forest far from man. The coast meadows literally swarm with the wild fowl of the country. The great white heron, the ibis, the egret, and the spurwing occur in thousands, and almost every bush and tree has its birds of prey that sit and plume themselves by the hour.

Besides these birds are others commonly found in tropical regions and especially in tropical South America. Among them are parrots, macaws, chatterers, humming birds, vultures, hawks, and owls. Almost all of them are noted for their brilliant plumage, which is most attractive in contrast to the greens and browns of the dense tropical foliage. But the birds of the tropics, however beautiful they appear to the eye, are not attractive to the ear;

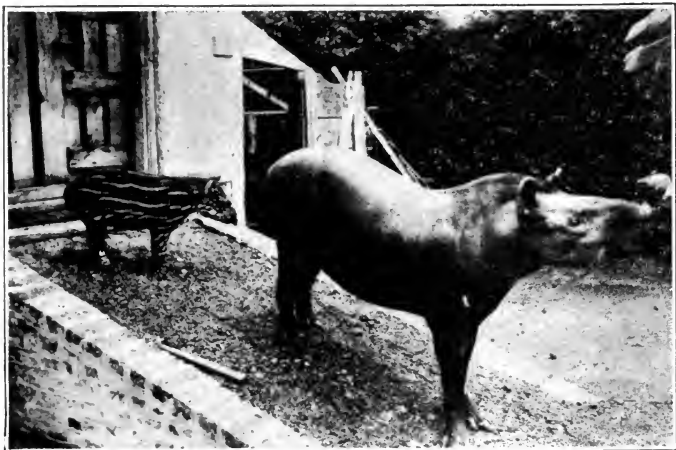


FIG. 178. *Tapir and young, one of the wild animals found in British Guiana*

their notes are coarse or guttural and in place of the musical tones of our northern birds one hears only sharp, shrill calls or loud, booming, throaty tones.

**The Migratory Indians of the Savannas.** When the white man came to Guiana he found the country overrun by scattered tribes of Indians; but to-day the Indian people are confined almost wholly to the interior. They have not gotten on well with the whites and under harsh treatment have fled farther and farther from the coast. Upon the interior savannas, the grasslands of Guiana, they still live in tribes and maintain nomadic habits, a peculiar religion, and strange social customs. They roam about at pleasure, although each tribe when hunting confines itself to a district that is not claimed by any other tribe in the country. They live as best they can in rough shelters such as may be made from huge palms, whose broad, flat leaves can be fastened together with little difficulty as a protection from the rain. Their shelter is but slightly better than that of the wild beasts they hunt for food. The only furniture they have are hammocks of their own making, which they use alike for sitting and for sleeping. It is the business of the men to hunt and fish, and of the women to cultivate the cassava, to weave the hammocks, prepare the food, and brew the drink. A stop is made in one place only long enough for a crop to be grown or until the game fails, when they embark in their rough canoes and search the rivers for some other hunting site.

**The River Names.** Every river and waterfall of the Indian country has its unseen deity and all the rivers are named from the kind of game found in them or from some striking characteristic which first impressed the people. One stream is called Macaw Creek, for the macaw is found there in greater numbers than is any other tropical bird.

Another is called Tapir Creek, another the Silk-cotton Creek, another the Creek of Flies and Mosquitos, another Snake Creek, and still another was called after the peculiar note of the frogs that inhabit it in great numbers. While the Indian names appear to us to have a very foolish sound, they are full of meaning to the natives and of downright value in their hunting expeditions. Hardly a game bird, beast, or fish can be mentioned whose name has not been used in the naming of some creek or river or mountain brook in the Guianas.

Other streams were named for the fruits on their shores, the nuts, wild plums, and pineapples gathered there for food. The Indians have not named a single stream for a person. It always bears some name which indicates what sort of a stream it is, what kind of food may be found there, whether it is easy or difficult to travel, or if it is known for its wild beasts and snakes.

Even the largest river of the Guianas bears an Indian name to which the Indians at one time attached significance. The name means in the Indian language "The River of Fire Stones," and is founded upon a story to the effect that a fleet of canoes filled with Arawak Indians once sought shelter at its mouth. A heavy storm was encountered and made it necessary to turn the canoes back behind some sheltering point. In turning up the river most of the canoes were upset. The Indians swam ashore, and later recovered their canoes, but not their fire stones. The fire stones are always carried in the bottoms of the canoes and are used in supporting the pots in which the Indians cook their food. It is of great importance to have these because the land is so low and flat that camp sites are found with great difficulty; and the alluvial river plains near the coast are of such fine material that stones are not found there. They must be brought oftentimes from great

distances, from the uplands and mountains of the interior, and are bought and sold like ordinary merchandise. To the Indians, the loss of the fire stones is a serious matter, quite as serious as if a cooking pot or a bow and arrow were lost, indeed more so, for the latter can easily be made almost anywhere. So the Arawaks named the river "The River of the Fire Stones," or the Essequibo River, and the Arawak word for this phrase was adopted by the whites and is in use to-day.

**The Bush Negroes of the Forest.** The "bush negroes" are a group of people found only in Dutch Guiana. Their settlements extend from near the French frontier westward to about the source of the Coppename River. They are a fine-looking lot of people: many of the men are more than six feet tall, with straight limbs and frank countenances. In many respects they live like the negroes one may find in the interior of Africa. They cultivate farms and even engage to some extent in the lumber trade.

The bush negroes were once slaves of the Dutch, but there were so many of them in the land that they became much stronger than their masters, and were able to gain their freedom. They ran away from their owners by thousands and were soon lost in the dense forest, through which their pursuers could travel only with the greatest difficulty. Once in the forest they could live as they had lived in Africa, by hunting and fishing and by cultivating the few simple vegetables upon which they depend for their supply of food. The Dutch were not inclined, however, to sit idly by and see their former slaves run off into the woods. They began a series of wars which lasted for more than seventy years and which cost not less than thirty millions of dollars. In addition to this great cost in money one must remember the great loss in lives, the

bitter feeling the war caused between the whites and the blacks, and the terrible blow which all these events dealt to the industries of the colony.

**The Beautiful Forests of the Guianas.** Nothing in the Guianas is more impressive than the great primeval forest as seen on the banks of the Essequibo in British Guiana. One may travel up the middle course of this river for seventy miles without finding an opening except where some tributary stream flows into it. The profuse vegetation literally hangs over the surface of the river like a curtain. But if the great South American forest is impressive and imposing, it is at the same time forbidding. On either bank the vegetation reaches to a height of from one hundred and seventy-five to two hundred feet, the whole forest being bound with innumerable creepers and trailers into a mass that the eye can scarcely penetrate. The sunlight barely reaches its interior, and what there is of it appears in scattered patches of reflected light.

“Now the creek is almost closed by a lattice of bush-ropes and then we have to pass under a leaning trunk or branch almost touching the water. Hundreds of cord-like aerial roots depend from the topmost branches of the trees, and have to be moved aside as we get among them, while great bunches of flowers depend from the creepers, which also obstruct the way in some places.

“If the creek is not kept open by Indians it is often choked by vegetation. A dense wall of creepers forms a curtain, and we can only push through by aid of our cutlasses, which are always carried for this purpose in bush traveling. Under water are the remains of trees which have fallen during several centuries. . . . When a giant mora is undermined by the flood, and can no longer be supported by its weaker neighbors, it comes down with a crash, carrying destruction to everything in its way. A

score of smaller trees will have their heads torn off or limbs severed, and perhaps a hundred palms, marantas, and low bushes be smashed to pieces." (*Keane.*)

In traveling through British Guiana one is struck by the almost total absence of anything beyond the wall of vegetation on either hand. Scarcely a single hut of any kind may be seen for miles. Only by looking closely at the river banks can one see, here and there under the bushes, a canoe or a small boat. If one goes closer, he finds a small opening; and if the water is low, a log may be seen lying on the mud; this is the landing stage. By means of it one may get ashore and find a narrow, muddy path which leads through the forest to a tiny hut, thatched with palm leaves, far back from the river.

**A City below Sea Level.** The most important city in the Guianas is Georgetown in British Guiana, with a population of fifty thousand. The greater part of it is below the level of high tide so that the houses are built on piles. On the whole it is a very unhealthful location in spite of the cool sea breezes that blow almost constantly during the day. The flat plain on which the city is built is drained with great difficulty. Through the center of many streets canals have been dug and on the placid surface of the water in them enormous *Victoria Regia* water lilies float. During a large part of the year the rains are heavy and frequent, a condition which has given rise to the saying in Georgetown that it only stops raining to begin pouring. Since the rains are abundant and the river water stagnant and unfit to drink the people depend upon rain water for drinking purposes, gathering it in cisterns built beside the houses so as to catch the drainage of the roof.

Georgetown exhibits a great mixture of races. There are negroes from Africa, coolies from India, and native

Indians, besides Portuguese, Chinese, English, Spanish, Jewish, and Dutch. The coolies were brought over from India to work on the sugar plantations just outside of Georgetown, for at one time the production of sugar was a great industry here but declined chiefly on account of the liberation of the slaves.

A short distance outside Georgetown the country becomes wild, and a thick jungle borders the banks of the rivers. With the exception of a short railway line the



Courtesy of W. D. Boyce

FIG. 179. *A view of Paramaribo, the capital of Dutch Guiana*

only means of communication is by boats of all sorts along the courses of the various lagoons, creeks, and rivers. For some distance inland the streams have gentle currents and the ocean tides run far upstream—on the Demarara for about ninety miles. Soon, however, the river boats reach a more rugged country with a series of great waterfalls around whose deep gorges and foaming cascades every pound of merchandise must be taken on men's backs with great labor. At many of them are towns of some importance where a carrying trade for the river merchants has sprung up.

Cayenne, the capital of French Guiana, and Paramaribo (Fig. 179), the capital of Dutch Guiana, are the

only other cities in the Guianas. All other centers of population are mere villages beside the rivers and canals or on the few footpaths and poor trails that lead toward the interior. The village populations rarely exceed a thousand; and a few dozen or a few hundred are much more common. Cayenne has thirteen thousand five hundred people and Paramaribo has thirty-four thousand, or about one third and one half of the total population of French and Dutch Guiana, respectively. Both are on the fringe of the land. Cayenne is on an island of the same name and Paramaribo is near the mouth of the Surinam River. Of the two, Paramaribo is by far the cleaner and the more beautiful. Both have high temperatures, are built almost at sea level, and are unhealthful. They represent, with Georgetown, the climax of such civilization as exists in these strange and backward tropical colonies—all that are left of the once vast European possessions in South America.



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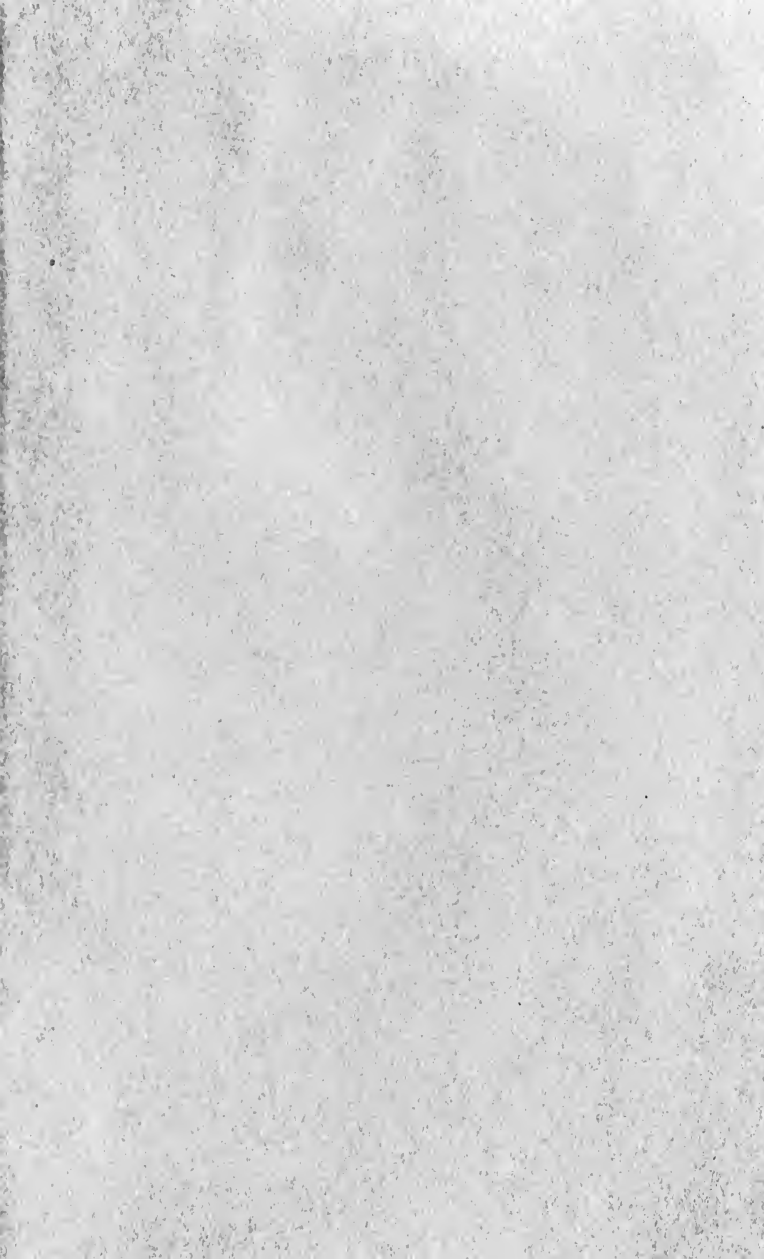
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